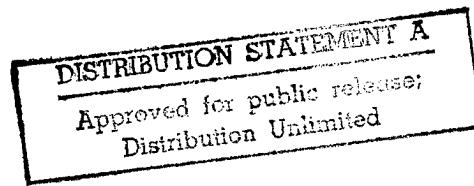




JPRS Report



Environmental Issues

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Environmental Issues

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Japan's Environment Head Says U.S. Must Curb Lifestyle

*OW2706090691 Tokyo KYODO in English 0846 GMT
27 Jun 91*

[Text] Tokyo, June 27 KYODO—Environment Agency Director General Kazuo Aichi criticized Americans on Thursday for their excessive resource-guzzling lifestyle and called for sacrifices to help curb environmental destruction, while reducing the budget deficit.

Americans make up just five percent of the world population but produce 23 percent of the world's carbon dioxide, a major factor contributing to global warming, the state minister told a luncheon at the Foreign Correspondents Club of Japan.

The huge U.S. budget deficit is also "clear proof that the (American) lifestyle requires reorientation," Aichi said.

He suggested that Washington start by raising the price of gasoline, saying the United States must "experience pain" if it is to become more environmentally friendly.

The minister declined to offer further advice, saying it could be regarded as interference in U.S. domestic affairs.

Aichi depicted Japan as an up-and-coming leader in world environmental affairs that could help bridge disputes between developing and industrialized nations on who should bear the economic burden of caring for the environment.

He said Japan would be ideal for the role due to its own experience in overcoming pollution diseases that spread in the 1960s and 1970s while the country was rushing to develop.

But he conceded that many Japanese developers have exhibited a "lack of consideration and concern" for the natural environment, and that the environment agency remains a weak force in the government, even in its 20th year.

Japan has angered environmentalists both at home and abroad with a number of development projects that threaten to destroy rare natural features, such as an unusual coral reef in the southern prefecture of Okinawa.

Japan has yet to introduce a national law requiring environmental assessments before projects are built due to opposition by the well-connected construction lobby.

PRC's Li Peng Addresses Beijing Environmental Conference

*HK2406051491 Beijing RENMIN RIBAO in Chinese
19 Jun 91 pp 1-2*

[Article by Li Peng, Premier of the PRC State Council: "Make Conceted Efforts To Promote International Cooperation in Environmental Protection and Development—Speech at 'Ministerial Conference of Developing Countries on Environment and Development'"]

[Text] Mr. Chairman, honorable representatives and guests of all countries, ladies and gentlemen:

First, I express warm congratulations to the convening of the "Ministerial Conference of Developing Countries on Environment and Development" on behalf of the Chinese Government and also in my personal name, and I sincerely thank representatives, observers, and guests of all countries for accepting the Chinese Government's invitation and for coming from all parts of the world to attend this important conference in Beijing! I would also like to use this opportunity to say thanks to government officials and experts from all countries who have made contributions to the preparation of this conference.

The common concern of all countries is focused on the issues of the world's environment and development. In today's world, which is faced with the tough challenge and threat from the deteriorating world environment, there exist opportunities and vigor for prosperity and development. Mankind must give his answer to and make his choice on the issue of how to meet the challenge, effectively solve environmental problems, and attain the goal of sustained development so that our future generations will have a planet to use perpetually and to live and work in peacefully and in contentment.

Developing countries, which account for most of the world's population, have very similar economic backgrounds and common demands for development. In dealing with issues concerning the world's environment and development, these countries can use each other's experiences for reference, strengthen mutual cooperation, and exert an importance influence on and play an active part in seeking coordinated and concerted action by all mankind. Today's gathering here, to discuss and draw on the collective wisdom on the world's environmental and development issues, is aimed at finding a way of development to maintain a balance in the earth's ecosystem and bring it into a benign cycle.

At present, we developing countries are faced with the dual task of economic development and environmental protection. Being stuck in prolonged poverty and backwardness, many developing countries sell their raw materials at low prices while buying manufactured goods at high prices; their wealth thus keeps flowing to and are accumulated by developed countries, while vast quantities of their natural resources are being consumed and their ecological environments are being seriously damaged. Such being the case, only when the unreasonable economic order is changed, poverty eliminated, and development promoted will developing countries be able to protect their own environments and better participate in cooperation for global environment protection. We developing countries must follow our own development roads that conform to our own national conditions, avoid following the same road of certain developed countries which have attained industrialization at the expense of environmental protection, and try our best to attain harmonious development in economic growth and environmental protection. With indelible contributions to human civilization in the past, the vast numbers of developing countries have now engaged in an arduous struggle to extricate themselves from poverty and improve their own environments, thus

displaying the spirit of holding themselves highly responsible for the common interests of mankind. The conference at the present time is an exact concentrated embodiment of this spirit.

Mr. Chairman:

As an important subject, the environmental issue has occupied a conspicuous position in the international forum. Both long-standing problems plaguing developing countries, such as land degeneration, soil erosion, and desertification, and the problems placed on the international agenda in recent years, such as climatic changes, the depletion of the ozone layer, and the varied extinction of living species, have all become global problems transcending national or regional boundaries. The emergence and evolution of these problems are closely related to economic and social development, and the consequences arising therefrom will exert an adverse effect not only on people of our generation, but also on those of the future ones. The solution of these problems requires a coordinated, concerted effort and effective cooperation by all countries and regions around the world. Economic development and environmental protection is an important component in the establishment of a new international order. In concrete terms, we believe it should include the following major contents:

- All countries—big or small, poor or rich—are endowed with the right to take part in activities of world environmental protection and development, while big countries should shoulder special responsibilities and obligations in this regard.
- Every country has the right to decide its strategies for economic development and environmental protection in light of its own conditions. In addition, it also enjoys permanent sovereignty over its natural resources and living species.
- Interests of countries with different natural conditions and at different development levels should be taken into consideration, and the needs of developing countries, which account for the majority of the world's population, should be fully reflected in international legislation for environmental protection.
- Major historical and actual responsibilities for today's worsening environment should be made clear. Moreover, the principles of justice and of differentiated responsibilities should be reflected.
- Adequate attention should be given to the environmental problems confronting developing countries and these problems should be resolved at the right time.
- Developing countries should make greater efforts in environmental protection and, at the same time, the international community should offer them necessary aid in terms of funds and technology in order to strengthen their very capability to participate in global environmental protection and development cooperation.

Moreover, both history and reality have told us that peaceful and stable international conditions are a must for

all countries in their attempts to attain economic development and environmental protection. Today, the world is at a time when the old world setup is changing to a new one, and the world's situation is turbulent. Facts have proven that large-scale wars and regional conflicts not only threaten mankind's survival but also do great harm to the environment. Therefore, we maintain that the following principles should be abided by in international affairs: Respect for a state's sovereignty and territorial integrity, mutual nonaggression, noninterference in each other's internal affairs, equality and mutual benefit, and peaceful coexistence. These are indispensable conditions for bringing about a sustained economic growth and improvement of the global environment.

The Chinese Government pays a great deal of attention to environmental protection, makes it a basic national policy, and makes efforts to bring about harmony between economic development and environmental protection. Of course, as the majority of developing countries, China is also faced with strenuous and burdensome tasks on the matter of environmental protection and development. In the last decade of this century, we will stick to the principles of reform and opening up and of stable development. While developing the economy, we will further upgrade environmental protection. In the meantime, we will start wide-ranging cooperation and exchange with all countries and regions around the world and will make our own contributions to global environmental protection.

Mr. Chairman, ladies and gentlemen: The Chinese Government resolutely supports the convening of the UN Conference on Environment and Development to be held in 1992 and will vigorously participate in the preparation of this conference. We believe it will be an international conference with great significance and hope that the conference will score better achievements in promoting international cooperation in environmental protection and bringing about world economic development.

I sincerely hope that through this current conference in Beijing, closer links among developing countries can be built and developed countries will be made to understand more about the problems that developing countries are concerned about, thus jointly making greater contributions to the successful convening of the 1992 UN Conference on Environment and Development and to global environmental protection and the healthy development of economy. Thank you!

Iranian Official Addresses Beijing Conference

NC2006153591 Tehran Voice of the Islamic Republic of Iran First Program Network in Persian 0330 GMT
20 Jun 91

[Text] Deputy President for Environmental Protection Manafi yesterday explained the Islamic Republic of Iran's views on environmental problems and their regional and international dimensions at a conference of environmental officials from developing countries which is being held in Beijing. Expressing concern over the worsening of environmental problems around the world, he said: The greenhouse effect caused by the use of dangerous chemicals, the

depletion of the ozone layer, the uncontrolled exploitation of natural resources, the growing gap between the rich and the poor, chemical and nuclear proliferation, the arms race, and the deliberate violation of international norms and regulations are among the problems threatening the environment which require coordinated international action to combat.

Mr. Manafi added: The industrialized countries have pillaged the world's ecological wealth for over two centuries and have not paid the heavy price necessary to protect the environment. The deputy president for environmental protection added: The Islamic Republic of Iran supports the idea that those who pollute the environment should pay to clean it up and believes that closer cooperation among developing countries to protect the environment is essential.

Song Jian Speaks at Close of Beijing Environment Conference

*OW1906142891 Beijing XINHUA in English
1253 GMT 19 Jun 91*

[Text] Beijing, June 19 (XINHUA)—The Ministerial Conference of Developing Countries on the Environment and Development, sponsored by the Chinese Government, ended here today with the approval of the "Beijing Declaration" and conference report.

Speaking at the closing ceremony, chairman of the meeting Chinese State Councillor Song Jian said that the participants discussed such issues as how to coordinate the relations between environmental protection and economic development, how to promote efficient international cooperation in the field and how to bring into play the role of the developing countries in global environmental protection and sustainable development.

He said that the "Beijing Declaration" adopted by the meeting shows the developing countries' profound understanding of and deep concern with the world environment and development.

It is an important contribution to the 1992 United Nations Conference on the Environment and Development by the developing countries and also a historical document guiding their work in world environmental protection and development in the future, he added.

He said the document will be sent to the secretary-general of the United Nations and the general secretary of the 1992 United Nations Conference on the Environment and Development.

Delegations from 41 developing countries, along with representatives from nine developed countries and 10 international organizations attended the conference.

Beijing Environmental Meeting Results Outlined

*OW1906155891 Tokyo KYODO in English 1426 GMT
19 Jun 91*

[Text] Beijing, June 19 KYODO—A ministerial meeting of 41 developing countries on the environment and development ended a two-day session on Wednesday with a

communiqué urging the establishment of a green fund and preferential transfers of technology for environment protection.

The communiqué said industrial nations have been destroying the environment by excessive exploitation of natural resources, mass production, and massive consumption since the 18th century industrial revolution.

The blaming of industrial nations for destroying nature reflects a Third World policy being promoted by China, which sponsored the ministerial meeting, a prelude to a United Nations-run conference on the environment and development, scheduled for June 1992 in Brazil, diplomatic sources said.

The communiqué requested industrial nations give developing countries easier market access by scrapping trade barriers, including high tariffs, and provide money and technology to help preserve nature in developing countries.

The Beijing meeting was attended by eight developed nations, including Japan in an observer status.

Beijing Environment Conference Declaration

*OW2006095291 Beijing XINHUA in English
0851 GMT 20 Jun 91*

[“Full Text of Beijing Declaration on Environment, Development”—XINHUA headline]

[Text] Beijing, June 20 (XINHUA)—Following is the full text of Beijing ministerial declaration on environment and development, which is adopted by the Ministerial Conference of Developing Countries on Environment and Development held here from June 18 to 19:

We, the ministers from forty-one developing countries, met in Beijing, at the invitation of the Government of the People's Republic of China, from June 18 to 19, 1991, at the Ministerial Conference on Environment and Development, and having discussed in depth the challenges faced by the international community in establishing norms of cooperation for the enhancement of environment and development, particularly the implications for the developing countries, declare as follows:

1. We are deeply concerned about the accelerating degradation of the global environment. This is largely on account of unsustainable development models and life styles. As a result, the basic elements indispensable for the human life—land, water and atmosphere—are gravely threatened. The more serious and widespread environmental problems are air pollution, climate change, ozone layer depletion, drying up of fresh water resources, pollution of rivers, lakes and the marine environment including the coastal zones, marine and coastal resources deterioration, floods and droughts, soil loss, land degradation, desertification, deforestation, loss of biodiversity, acid rain, proliferation and mismanagement of toxic products, illegal traffic of toxic and dangerous products and wastes, growth of urban agglomerations, deterioration of living and working conditions in urban and rural areas, especially

of sanitation, resulting in epidemics and other such problems. Furthermore, poverty in the developing countries is becoming aggravated, hampering the efforts to meet the legitimate needs and aspirations of their people and exerting greater pressures on the environment.

2. We affirm that environmental protection and sustainable development is a matter of common concern to humankind, which requires effective actions by the international community and provides an opportunity for global cooperation. Against this background and out of a strong concern for the present and future generations, we hereby reaffirm our solemn commitment to participating actively, on the basis of differentiated responsibilities and to the best of our ability, in the global efforts for environmental protection and sustainable development, keeping in view the general principles and broad approach set out below.

I. General Principles

3. Changes in the environment are closely related to economic and social activities. Environmental problems must not be viewed in isolation, and need to be addressed together with the process of development, by integrating environmental concerns with the imperatives of economic growth and development. In this connection, the right to develop of the developing countries must be fully recognized, and the adoption of measures for the protection of the global environment should support their economic growth and development. In particular, the international community must actively support the efforts of developing countries to strengthen their institutional and technical capacities.

4. The special situation and needs of the developing countries should be fully taken into account. Each country must be enabled to determine the pace of transition, based on the adaptive capacity of its economic, social and cultural ethos and capabilities. The environmental problems of the developing countries arise from the conditions of poverty. The development process initiated by these countries utilizing the old polluting technologies provided by the developed countries also contributes to the degradation of the environment, which in turn, undermines the development process itself. This adversely affects not only the developing countries but also the entire world. Sustainable development and steady economic growth constitute a way to break this cycle of poverty and environmental degradation and to strengthen the capabilities of the developing countries for environmental protection. The least developed countries, disaster-prone developing countries as well as island and low-lying developing countries should be given special attention by the world community.

5. The inequities in current international economic relations confronting the developing countries, especially with regard to debt, financing, trade and transfer of technology, have led to serious consequences for them, including the reverse flow of financial resources, braindrain and backwardness in their scientific and technological capabilities. The economic development of the developing countries

has thus been constrained and their capability to participate effectively in global environmental efforts undermined. It is therefore imperative to establish a new and equitable international economic order conducive to the sustained and sustainable development of all countries, particularly the developing countries, thereby creating the conditions necessary for global cooperation to protect the environment. Countries should be able to determine their own environment and development policies, without any barriers or discrimination on trade against them.

6. International cooperation in the field of environmental protection should be based on the principle of equality among sovereign states. The developing countries have the sovereign right to use their own natural resources in keeping with their developmental and environmental objectives and priorities. Furthermore environmental considerations should not be used as an excuse for interference in the internal affairs of the developing countries, nor should these be used to introduce any forms of conditionality in aid or development financing, or to impose trade barriers affecting the export and development efforts of the developing countries.

7. While the protection of the environment is in the common interest of the international community, the developed countries bear the main responsibility for the degradation of the global environment. Ever since the industrial revolution, the developed countries have over-exploited the world's natural resources through unsustainable patterns of production and consumption, causing damage to the global environment, to the detriment of the developing countries.

8. The developed countries, in view of their main responsibility for environmental degradation and their greater financial and technological capabilities, must take the lead in eliminating the damage to the environment as well as in assisting the developing countries to deal with the problems facing them.

9. The developing countries need adequate, new and additional financial resources to be able to address effectively the environmental and developmental problems confronting them. There should be preferential and non-commercial transfer of environmentally sound technologies to the developing countries.

10. On their part, the developing countries will contribute to the process of environmental protection and enhancement by, *inter alia*, stepping up technical cooperation and transfer of technology among themselves.

II. Sectoral Issues

11. Land degradation, desertification, floods and droughts, worsening quality and supply of fresh water resources, soil loss, deforestation and vegetation degradation are among the serious environmental problems confronting the developing countries. These constitute a major part of the problem of global environmental degradation, to which priority should be accorded. These problems have been discussed in international fora, and some plans of action have been proposed or approved. However, no effective

actions have been taken so far by the international community towards their implementation. We urge the international community to immediately initiate actions in this regard, particularly by establishing an international funding mechanism for this purpose.

12. We are gravely concerned with the continuous increase in the green-house gases leading to climate change and its likely implications for the global ecological system, especially the threat that they pose to the developing countries, and to the island and low-lying developing countries in particular. Responsibility for the emission of greenhouse gases should be viewed both in historical and cumulative terms, and in terms of current emissions. On the basis of the principle of equity, those developed countries which have contaminated more must contribute more. Developed countries should therefore commit themselves to adopting measures to halt human-induced climate change and to setting up mechanisms to guarantee the environmental security and development of the developing countries, including the transfer to the developing countries, on preferential and non-commercial terms, of technologies for this purpose.

13. The framework convention on climate change currently being negotiated should clearly recognize that it is the developed countries which are mainly responsible for excessive emissions of greenhouse gases, historically and currently, and it is these developed countries which must take immediate action, with time-bound targets, to stabilize and reduce such emissions. Developing countries cannot be expected to accept any obligations in the near future. However, they should be encouraged through technical and financial cooperation to undertake measures within their plans, priorities and programs which contribute both to their economic development and to the efforts to tackle the problem of climate change, without prejudicing their growing energy needs. The framework convention must include, inter alia, firm commitments by developed countries towards the transfer of technology to developing countries, the establishment of a separate funding mechanism, and the development of the economically viable new and renewable energy sources as well as sustainable agricultural practices, which constitutes an important step to deal with the major cause of climate change. In addition, the developing countries must be provided with the full scientific, technical and financial cooperation necessary to cope with the adverse impacts of climate change.

14. We further agree that the purpose and principles of the Vienna Convention on the protection of the ozone layer and Montreal Protocol on substances that deplete the ozone layer, as amended in June 1990, are positive in nature. The implementation by the developing countries of the obligations under the amended protocol is subject to the effective implementation by the states parties to the protocol of the arrangements for the provision of financial resources and transfer of technology to the developing countries. We urge the developed countries to commit themselves to the long-term arrangements for providing adequate financial resources and the expeditious transfer

of technology as required of them under the Vienna Convention and the Montreal Protocol, as amended in June 1990.

15. We are concerned at the accelerating loss of biodiversity. Most living organisms and their habitats in the world belong to the developing countries and they have borne the cost of conserving them over the ages. Such efforts should be recognized and supported by the international community and in international conventions and subsequent protocols. Each state has sovereignty over its biological resources, thus conservation measures should be compatible with its national plans and priorities. The international legal instrument on biodiversity now being negotiated must clearly recognize, inter alia, the linkage between access to genetic material and transfer of technology, research and development in the country of origin, sharing of the fruits of scientific research and the commercial profits. Issues of intellectual property rights must be satisfactorily resolved so that they do not become an obstacle to the transfer of technology, including biotechnology. Furthermore, the international legal instrument must recognize and reward the innovative work done by rural population, largely in developing countries, in protecting and utilizing biodiversity.

16. We note that though control and management of hazardous wastes and toxic substances require international cooperation, the Basel Convention adopted two years ago has not entered into force. We therefore urge those states which have not ratified the convention to consider the possibility of becoming parties to it. We urge all states to take steps to provide for a liability and compensation regime; mechanisms for transfer of low-wastes technologies to the developing countries; development of capabilities for identification, analysis and disposal of wastes and mechanisms for adopting a world-wide ban on export of hazardous wastes to developing countries which do not have such capabilities. Likewise, we are concerned with the continuous illegal traffic of toxic and dangerous products and wastes, particularly from developed to developing countries. We urge the developed countries to take appropriate measures to halt such traffic.

17. Multilateral measures to protect forests and promote their sustainable management, including the proposal for a global consensus on forestry, should be aimed at enhancing the economic, social and environmental potentials of forest. Management plans should integrate living resource conservation and development priorities and goals, taking into account the needs of the local communities, including their habitats. In this respect, efforts, including specific projects of developing countries to promote the utilization of the tropical forests on a sustainable basis, should be recognized and supported. It should take the form of financial and technical assistance, as well as ensuring better market access for higher value-added timber products. It is equally important to ensure financial cooperation by the world community for forest conservation and development. Towards this end, the international community should, among other things, make efforts towards the greening of the world and countries which had in the past

so destroyed their extensive forests should increase their forest cover through reforestation and afforestation programs.

18. We are deeply concerned about the spread of desertification process and continuity of prolonged drought cycles, which have been recognized by the international community as major environmental problems. Hence there is an urgent need to accord high priority to these problems to take all necessary measures including the provision of appropriate financial, scientific and technical resources in order to stop and reverse the process of desertification and drought, with the aim of contributing to the preservation of the global ecological balance.

19. The marine and coastal resources deterioration resulting from irrational exploitation and pollution, mostly by developed countries, constitutes a serious development constraint for those countries that depend on them. It is necessary to enlarge cooperation on the protection and use of regional seas and to improve their rational utilization based on better knowledge and information. Discharge of toxic and nuclear wastes at seas and oceans must be banned, and that of other wastes should be strictly regulate.

20. In the densely populated cities of developing countries, insufficiency of resources causes inefficiency of the basic public services, high marginality and degradation of the urban environment. The urban planning, including mechanisms for financing sustainable development, must contribute to enhancing the quality of life in the urban and rural settlements. In this context, the new mechanisms for financing sustainable development should give priority to those problems.

III. Cross-Sectoral Issues

21. The key to the success of the global efforts for the protection of the environment is the broadest possible participation of the international community; this depends to a large extent on whether substantial progress can be made on cross-sectoral issues, including in particular, the availability of adequate, new and additional financial resources and transfer of technology on preferential and noncommercial terms to the developing countries.

22. With regard to global environmental issues, every international legal instrument should include provisions for adequate, new and additional funds, which should lay down in explicit terms the commitments of the developed countries in this regard. A key factor is the adequacy of financial resources, which should be sufficient for the developing countries to cover the incremental costs involved in addressing the issues and in implementing their relevant commitments derived from international legal instruments. Contribution by the developed countries should be sufficient to cover the costs not only of prevention but also of mitigating the cumulative effects of past actions. Developing countries could also contribute, on a voluntary basis, to the funds.

23. In order to deal with the long-existing but now rapidly aggravating environmental problems of immediate concern to the developing countries, a special green fund should be established to provide adequate and additional financial assistance to them. This fund should be used to address problems which are not covered by specific international agreements, such as water and coastal pollution, shortages and degradation of fresh water resources, deforestation, soil loss, land degradation and desertification. It should also cover the costs of the transfer of environmentally sound technologies and the costs of building up national capabilities for environmental protection and for scientific and technological research. This fund should be managed on the basis of equitable representation from developing and developed countries, and should ensure easy access for developing countries.

24. We emphasize the important role of science and technology in protecting the global environment, and reaffirm that measures need to be taken to ensure the transfer of environmentally sound technologies to the developing countries on preferential, most favorable, concessional and non-commercial terms. The transfer of these technologies to the developing countries should be regarded as a contribution to the common interests of humankind. The developed countries should promote the transfer of environmentally sound technologies to developing countries, through procedures and arrangements including incentives and disincentives to the private sector.

IV. The United Nations Conference on Environment and Development

25. In accordance with the United Nations General Assembly Resolution 44/228, we emphasize that the United Nations Conference on Environment and Development in 1992 should not only discuss the global environmental issues such as climate change and ozone layer depletion and the related response strategies. It should also be a forum to address other global issues confronting the developing countries, particularly those development issues related to environment. The relevant agreements reached at the conference must provide guidance to international deliberations on trade, finance, technology and other similar issues. The interlinkages, where relevant, should be incorporated in each.

26. We believe that the proposed earth charter and agenda 21 resulting from the United Nations Conference on Environment and Development should be compatible with the principles embodied in relevant resolutions of the United Nations General Assembly. Furthermore, they must reflect the outcome of the conferences of developing countries with regard to the interrelationship between environment and development, and the special situation and the needs of the developing countries. The agenda should be action-oriented to solve the environmental problems and meet the needs of the developing countries with the aim of integrating environmental concerns with development.

27. We also believe that poverty is at the root of the environmental problems of the developing world. The conference could provide new strength and momentum to the proposed launching of a huge world program against poverty and its effects on world environment.

V. Coordination and Cooperation Among Developing Countries on Environment and Development

28. We agree that the environment-related efforts at various international fora, particularly in the preparatory process for the 1992 conference, will have direct and far-reaching implications for the developing countries. We emphasize that it is a pressing task for us as developing countries to intensify consultations and coordination among ourselves in an effort to present our positions at international fora more effectively so as to safeguard better the interests of the developing countries as a whole.

29. We decide to strengthen further consultations and coordination among developing countries in the preparatory process for the 1992 conference and at other international fora, along the lines of the New Delhi conference in 1990 and the Beijing conference.

30. We believe that measures should be taken to explore the ways and means and modalities for economic and technical cooperation among developing countries in the sphere of environment and development. In this regard, developing countries will also endeavor to set appropriate environmental goals for attaining better quality of life and environmental well-being, while at the same time identify and assess the financial and technological needs for achieving such goals.

31. We support the retaining and strengthening the headquarters of the United Nations Environment Programme and all its programme activity centers in Nairobi, considering the success the programme has achieved to date from this venue and the need to have it better equipped for carry on its work.

32. We re-emphasize that we intend to participate fully in the global effort to protect the environment without hindering the development process and that this can be achieved if the right climate is created for global cooperation by a positive, constructive and practical response on the part of the developed countries, so that we can jointly promote the well-being of the present and future generations.

PRC's Wu Xueqian Praises Achievements of Beijing Conference

*OW1906210591 Beijing XINHUA in English
1422 GMT 19 Jun 91*

[Text] Beijing, June 19 (XINHUA)—Chinese Vice-Premier Wu Xueqian said here today that the Beijing Declaration adopted at the ministerial conference of developing countries on the environment and development sets forth systematically the principled positions and propositions of the participating countries.

Addressing the delegates at a reception here this evening to mark the conclusion of the conference, Wu said that the

Beijing Declaration also gives expression to the aspirations of the developing countries for active involvement in the relevant international cooperation.

Wu said, "I am convinced that this conference and its achievement will be important contributions to the UN Conference on the Environment and Development in 1992 and its preparatory process."

The conference shows the profound concerns of the developing countries over the issues of global environment and development, and their determination to strengthen cooperation in the areas of the environment and economic development for the common interests of mankind, he said.

He expressed his confidence that, through the common efforts of the international community, global cooperation will surely be enhanced in the fields of the environment and development.

PRC Commentator on Beijing Environment Conference

*HK2106111491 Beijing RENMIN RIBAO in Chinese
20 Jun 91 pp 1, 4*

[Commentator's article: "Program for Working Together To Promote International Cooperation in Environment and Development—Greeting Birth of 'Beijing Declaration' by Ministerial Conference of Developing Countries on Environment and Development"]

[Text] With the common efforts and close coordination of the representatives from 41 Asian, African, and Latin American countries, the "Ministerial Conference of Developing Countries on the Environment and Development," sponsored by the Chinese Government, successfully ended yesterday. The result of this grand meeting is fully reflected by the "Beijing Declaration" adopted by the meeting, which expounds in explicit terms the principled stand and basic viewpoints of the developing countries on the solution of the global environment and development problem and expresses their common aspirations of protecting the environment and seeking development. It is a programmatic document for promoting international environmental cooperation and worldwide economic development from the angle of the developing countries. The approval of the "Beijing Declaration" is, undoubtedly, a substantial contribution to the United Nations Conference on the Environment and Development, which will be held in Brazil in 1992. It will certainly have a positive and profound influence on the fair and reasonable solution of the worldwide environment and development problem.

The worldwide environment and development problem is the focus of attention in the contemporary world. Global environmental deterioration is becoming an increasing threat to the subsistence and development of mankind. How to effectively solve the environmental problem and realize the goal of sustained and steady development is a pressing task facing the international community. The practice of mankind in recognizing and transforming the world shows that environmental protection and economic

development are interdependent and interrelated. Environmental protection is the necessary condition for a sustained and steady economic development, and the latter is the material basis for the former. We cannot blindly seek development, disregarding the tolerance of the ecological environment, nor can we unilaterally stress environmental protection and improvement without promoting economic development. Especially the developing countries, which are shouldering both tasks of economic development and environmental protection, must ensure their economies are continuously developed while participating in the worldwide environmental protection campaign and must blaze new trails for bringing economic development into line with environmental protection in light of their concrete national conditions. The conference held that the efforts made for environmental protection should not become an obstruction for the economic development of the developing countries. Otherwise, they will become poorer and their environmental problems will become even more serious. This is a summation of both historical and practical experiences. The developing countries can extricate themselves from a predicament in environmental protection only by developing their national economies and getting themselves out of poverty and backwardness.

The solution of the environmental and development problem is the common interest and common responsibility of all human beings. At present, it is necessary and possible to establish a new relationship of international cooperation in this important field, which concerns the destiny of mankind. This cooperation should be established on the basis of equality among various sovereign states. All countries, big and small, rich and poor, have the right to participate in international environmental protection and development affairs. We should not allow any country to interfere in the internal affairs of other countries under the pretext of environmental protection and should not allow any country to use environmental protection as an additional condition for providing aid or granting loans to the developing countries. We must point out that due to historical and practical reasons, the developed countries should shoulder more responsibilities and duties in the international cooperation for environmental protection and development. Apart from ensuring the existing development funds and economic aid, they should also provide the developing countries with an additional sum of environmental protection funds and transfer advanced environmental protection technologies to them on favorable terms. This will help the developing countries to successfully perform their lofty duty of global environmental protection while achieving development in their national economies. We believe that provided all countries strengthen their mutual understanding and give consideration to their mutual interests, they will surely be able to make concerted efforts to protect the earth, on which mankind relies for existence and development, and there will surely be a "Noah's Ark" for the coming generations to live and work in peace and contentment.

While studying the methods for solving the global environmental problem, it is necessary to attach importance to the

more pressing environmental problem of the developing countries. The "Beijing Declaration" emphasizes that the developing countries are faced with many serious problems such as deteriorating soil texture, flood and drought disasters, the dropping quality of fresh water and shortage of fresh water supply, soil erosion, and forest destruction, and they must also be put on the agenda for global environmental protection.

Solution of the environmental problem of the developing countries is as important as the solution of the global environmental problem. The international community should make concerted efforts to give it powerful support.

The Chinese Government attaches great importance to the protection of the ecological environment, regarding it as a basic national policy. This work has been brought into line with the program for national economic and social development, and the policy of harmonious development of economic construction and environmental protection is being forcefully implemented. China has a vast territory and a big population. While it is trying its best to protect its own environment, it is contributing to the improvement of the global environment. The Chinese Government always takes a positive attitude toward international environment and development affairs and is willing to shoulder reasonable international duties. It is willing to seek effective channels for solving the environment and development problem with other countries by strengthening international cooperation. We believe that establishing a new international environmental cooperation is an important component part of an international new order. Only by establishing a fair international new order and improving the international economic environment can the capability of the developing countries be enhanced in the international cooperation for environmental protection and development. Both economic development and environmental protection need a peaceful international climate. It is necessary to endeavor to create a peaceful international climate on the basis of the five principles of peaceful coexistence. This is a necessary condition for achieving a sustained economic development and improving the global environment. The Chinese Government will continue to carry out its policy of reform and opening up and will, together with all other countries, make unremitting efforts to establish an international new order and create a peaceful international climate.

The successful conclusion of the "Ministerial Conference of Developing Countries on Environment and Development" and the approval of the "Beijing Declaration" are important and practical measures for strengthening South-South cooperation and promoting South-North dialogue in the field of environmental protection and development. We believe that the positive and realistic attitude of the conference and the declaration toward cooperation will be widely responded and forcefully supported by the international community.

Antarctic Treaty Body Meeting Ends, PRC Pledges Cooperation

*OW2306081191 Beijing XINHUA in English
0744 GMT 23 Jun 91*

[Text] Madrid, June 22 (XINHUA)—The third meeting of the 11th special consultative conference of the Antarctic Treaty Organization ended in Madrid today.

300 representatives from 39 organization member states attended the six-day conference.

The meeting examined the articles concerning environmental protection in the Antarctic in the protocol being worked out at the second meeting here in April.

Under the protocol, all exploitation of mineral resources and oil (extraction for scientific research purposes excluded) will be prohibited within the next 50 years in that region, for a clean protection of the environment in the Antarctica.

The protocol can be effective only after it is approved unanimously by the 26 consultative nations of the organization which enjoy the right to vote.

Because of the disagreement of the United States in that the above prohibition could be lifted only by a full consensus of all the consultative states, the conference decided to have another meeting here in a bid to eliminate the differences before the 16th regular meeting of the organization in October.

As a full member state of the organization, a Chinese delegation attended the meeting and pledged further efforts to cooperate with other consultative states for an early adoption of the protocol.

PRC Delegation Signs Montreal Protocol on Ozone Protection

OW2006130391 Beijing XINHUA Domestic Service in Chinese 0644 GMT 20 Jun 91

[By Radio Beijing reporter Li Shoudao (2621 7445 6670) and XINHUA reporter Wang Jinyu (3769 6855 0151)]

[Text] Nairobi, 19 June (XINHUA)—The Chinese delegation attending the third meeting of signatories to the "Montreal Protocol on Substances That Deplete The Ozone Layer" issued a declaration here today about the Chinese Government's decision to join the amended version of the protocol.

Speaking at the plenary session, Wang Yangzu, head of the Chinese delegation and deputy director of the State Environmental Protection Bureau, said: A letter of participation was forwarded to the UN secretary general on 14 June by the Chinese Government, which signaled China's intention to join the other signatory countries and relevant international organizations in making due contributions toward protecting the ozone layer, on which mankind depends for its survival, and the global environment.

In his speech to the meeting, Mr. Tolba, executive director of the UN Environment Program [UNEP], praised China's decision, describing it as "most welcome news." He urged

other countries to expedite the approval process in connection with their participation in the amended "Protocol." Delegates from the United States, Finland, the United Kingdom, and Japan spoke one in turn. They applauded China's decision and expressed hopes for strengthening cooperation with China.

The "Montreal Protocol," drawn up in Montreal, Canada, on 16 September 1987, is designed to control global emissions of ozone-depleting substances and to protect the ozone layer through preventive measures. It was amended in London, the United Kingdom, on 29 June of last year. In addition to expanding the scope of controlled substances and shortening the periods of usage for such substances, the amendments were aimed at instituting a provisional and multilateral fund, setting more specific provisions regarding technological transfers to be conducted under equitable and most favorable conditions, and abolishing some clauses that discriminated against developing countries. The amended "Protocol" will take effect on 1 January 1992, if the number of approved signatory countries exceeds 20 before the end of this year.

According to the amended "Protocol," the UNEP will establish a provisional and multilateral fund, totaling some \$200 million, to help developing countries gradually reduce the production and consumption of controlled substances. The fund will be financed by developed countries and will have a three-year period of validity.

Environment Ambassador Says ROK To Join Montreal Protocol

SK2606045991 Seoul THE KOREA TIMES in English 26 Jun 91 p 3

[Text] South Korea is to join the Montreal Protocol Global Environment Treaty, which aims to phase out the use of ozone-destructive chlorofluorocarbons (CFCs) by the year 2000, next year.

Korea will try to join the protocol as a "friend economy," which is granted extensions and special provisions in complying with the regulations, first environment Ambassador Kwon In-hyok said yesterday. The Soviet Union is the only country currently in this category.

Korea's CFC market is estimated at some 5 billion U.S. dollars for 1,500 companies. After the Montreal Protocol activates its regulations on CFCs sometime between late this year and early next year, member countries can close their doors to imports from nonmember nations.

Kwon returned Monday from the third meeting of the parties to the Montreal Protocol in Nairobi June 19-21.

After the legal steps are completed by year-end, Korea will submit an application to the body, which was formed under the leadership of advanced nations in 1987 to protect the ozone layer.

British Airways Reports on Upper Air Pollution

91WN0514A London THE DAILY TELEGRAPH in English 15 May 91 p 4

[Article by John Harlow, Travel Correspondent]

[Text] Passenger aircraft are major polluters of the upper atmosphere, emitting up to five million tons of noxious gases every year. But there seems little hope of a "quick fix" to clean up their engines, according to reports published yesterday by British Airways [BA] and the Geneva-based Interavia company.

Planes emit up to a fifth of all nitrogen oxides from transport around the world, making even the most advanced plane far "dirtier" than a small fleet of buses capable of carrying the same number of people.

The research, gleaned from airlines and scientists across Europe, is worrying airline chiefs because it may force governments to bring airlines under international clean-air agreements due to be signed in Brazil next year.

Aircraft designers are going to find it far more difficult than car manufacturers to cut down nitrogen oxide emissions without radically overhauling engine technology and, inevitably, driving up air fares.

Nitrogen oxides are emitted when aviation fuel burns. They contribute to ground-level smog and, in combination with atmospheric droplets, form acid rain.

Scientists are also worried about other jet engine emissions, including carbon dioxide and methane, which add to global warming, and chlorofluorocarbons, which weaken the upper atmosphere's "sun block."

Interavia says the five million tons of nitrogen oxides present an almost insurmountable problem for air travel, demanding research which is bound to increase ticket prices, though BA hopes that within the next few months answers can be found.

Mr. Mark Pilling, of Interavia, said: "Sweden already levies a pollution tax on its domestic airlines, and there are hints this may become a growing trend in Europe."

Dr. Hugh Sommerville, who was appointed by BA to investigate green issues last year, said yesterday: "We know about noise, but there are many unanswered questions about atmosphere pollution.

"Decisions will have to be made very soon about global warming; but I am concerned that, with the lack of some hard facts, governments could lay down some harsh rules which may not benefit the flying public."

In the next two weeks BA engineers will meet Rolls-Royce to discuss modifying engines on its 250 planes. Dr. Sommerville said it was comparatively easy to cut nitrogen oxides by 20 percent, but after that it became costly. "The trouble is, the more fuel efficient the engine the more nitrogen oxides it gives out."

Results of ASEAN Environmental Meeting in Singapore

OW1906212591 Beijing XINHUA in English 1539 GMT 19 Jun 91

[Text] Singapore, June 19 (XINHUA)—Senior ASEAN officials closed their three-day meeting on environment

here today with a call for new environmental strategies and plan of action to take the region into the 21st century.

The meeting, the second of its kind, discussed major global environmental issues as part of preparations for ASEAN's participation in the United Nations Conference on Environment and Development (UNCED) in Brazil next year.

They also discussed climatic changes, ozone depletion, protection of oceans and seas, transboundary air pollution and management of toxic and hazardous wastes.

The officials agreed to form an ad hoc working group on UNCED to further develop the common stand of ASEAN, which consists of Brunei, Indonesia, Malaysia, the Philippines, Singapore and Thailand.

They also proposed the setting up of an ASEAN subregional environment trust for carrying out ASEAN's environmental programs.

Japanese Environmental Fund Planned To Aid Developing World

OW1906141391 Tokyo KYODO in English 1332 GMT 19 Jun 91

[Text] Tokyo, July 19 KYODO—The Japanese Environment Agency [EPA] on Wednesday approved the creation of a fund designed to finance environmental protection activities in developing countries, EPA officials said.

They said the "Global Environment Japan Fund" will be set up July 1 with 20 million yen donated by eight Japanese trust banks.

Donations will be accepted at all eight banks from both private citizens and companies.

The fund will provide help for projects such as protecting tropical forests and environmental education. It will also help researchers promote regional economic development.

The officials said donors of more than 10 million yen will have funds named after them if they wish.

Chile Expresses Support for Malaysia's Forestry Policy

BK2206103091 Kuala Lumpur BERNAMA in English 0957 GMT 22 Jun 91

[By Abdul Rahman Sulaiman]

[Text] Santiago, June 22 (OANA-BERNAMA)—Chile has assured Malaysia of its full support for its attempt to prevent the adoption of an international convention to restrict and control logging of tropical forests.

The assurance was given by the Chilean Foreign Minister Enrique Silva Cimma during a meeting with Foreign Minister Abdullah Ahmad Badawi here Saturday.

A spokesman of the Malaysian delegation accompanying Malaysian Prime Minister Dr. Mahathir Mohamed on his five-day official visit here told newsmen that Chile understood fully Malaysia's concern over the matter as the country itself was involved in logging of temperate forests.

The spokesman pointed out that Malaysia's fear over the possibilities was generated from the ongoing move by developed countries to adopt such a convention at the upcoming UN conference on environment scheduled to be held in Brazil next year. He said such a move would certainly undermine the economies of timber producing countries, of which Malaysia was one of the biggest.

Havel Opens International Environmental Conference Near Prague

*LD2106203791 Prague CTK in English 1638 GMT
21 Jun 91*

[Text] Prague June 21 (CTK)—“You currently find yourselves in a country that suffers from immense environmental problems and is at the same time one of the biggest polluters of the environment in Europe,” Czechoslovak President Vaclav Havel said at Dobris Castle near Prague today.

In his opening address to a three-day conference subtitled: “Environment for Europe,” which is attended by environment ministers of 32 European countries, the United States, Canada, and Japan, Havel spoke about some of the reasons for this catastrophic state of affairs. “...For decades wholly unqualified people decided everything in our country. Under communism, obedience to the party was more important than expertise. That is why decision-making was in the hands of incompetents,” Havel said.

The totalitarian system ignored public opinion, especially critical views, continued Havel. “The opinions of ordinary people, environmentalists and environmental protection movements thus were not taken into consideration,” he noted.

“Another reason (for the catastrophic state of Czechoslovakia's environment) was the very structure of our economy, our energy policy, our industry and its subordination to the strategic and military interests of the Soviet Union. All were oriented in one direction: towards an incessant growth in production at all costs,” Havel said.

He voiced the conviction that the outcome of the Dobris conference and the institutionalisation of pan-European environmental policies would highly contribute to the unification of the European continent.

The first all-European conference of environment ministers sponsored by the Czechoslovak Federal Committee for the Environment, will deal with the creation of a European system of environmental protection, preparations for an environmental programme for Europe and with relation between the quality of the environment and the lifestyle until the 21st century.

CSFR's Vavrousek Says European Environment Program To Be Created

*AU2806121591 Prague CTK in English 1549 GMT
26 Jun 91*

[Text] Prague June 26 (CTK)—Czechoslovak Minister-Chairman of the Federal Environmental Committee Josef

Vavrousek told reporters today that last weekend's conference on the environment in Europe produced a near consensus among European environmental ministers and officials on a common approach in future.

Vavrousek said the conference, held June 21-23 in Dobris near Prague, was “a great success, exceeding all my expectations”.

In particular, he noted the officials' agreement on the preparation of a joint European program on environmental protection by the year 1993. This program will be based on analytical studies in all the countries involved, and on existing national and regional environmental programs.

Participants from Eastern and Central Europe managed to convince their Western counterparts that current European institutions are not enough, said Vavrousek, as the dissolution of the CMEA, the former socialist trade bloc, means the former East bloc countries no longer have any institutional basis for coordinating and implementing their policies in this area.

Czechoslovakia proposed the establishment of a European environmental protection agency with its headquarters in Prague.

Also important, in Vavrousek's view, was the unanimous agreement that it will be impossible to solve today's urgent environmental problems without a change in people's lifestyles.

No Future for Nuclear Energy, Prague Congress on Environment Says

*AU2606145991 Prague CTK in English 2013 GMT
24 Jun 91*

[Text] Prague June 24 (CTK) - “It has been proved that there are no long-term prospects for nuclear energy”, the Secretary-General of the 5th World Congress “Energy, Environment and Peace”, Alois Englander, said at a press conference here today following the end of the five-day congress.

He said participants in the congress recommended the speedy adoption of energy-saving measures. Energy prices should favor environmentally friendly energy sources, he stressed. Hermann Scheer of Germany urged the development of solar energy. He suggested that an international solar energy agency be established, with Prague as its headquarters.

120 experts from all over the world took part in the congress. In their concluding statement they appealed to all parliaments, governments and heads of state to be aware of their responsibility for the environment and base future decision making on the concept of controlled development. The countries of Central and East Europe have a unique opportunity to change their energy policy during this period of transition to democracy and a new economic system, the statement says.

France, CSFR Sign Environmental Cooperation Agreement

*LD2206030191 Prague CTK in English 2006 GMT
21 Jun 91*

[Text] Prague June 21 (CTK)—An agreement was signed today between the French Environment Ministry and the Czechoslovak Federal Committee for the Environment on cooperation in environmental protection.

The document, initiated at the international environmental conference being held at Dobris Castle, provides for cooperation in preventing and controlling the air and water pollution, and in handling household and industrial waste. It also covers cooperation on operating safety at nuclear power plants.

A Czechoslovak-French committee was set up to coordinate environmental cooperation.

CSFR Signs Environment Accords With Netherlands, Germany, Poland

*LD2206184291 Prague CTK in English 1642 GMT
22 Jun 91*

[Text] Prague June 22 (CTK)—A memorandum of understanding on cooperation in environmental protection was signed today by Josef Vavrousek, minister-chairman of the Czechoslovak Environmental Committee, and Hans Alders, Dutch minister of housing, planning and the environment.

In the document, signed during the international conference on "Environment for Europe" at Dobris near here, the two countries pledge to cooperate in the protection of the air, water and soil.

Also at Dobris today, Vavrousek signed a joint statement with Germany and Poland committing the three countries to improve their cooperation in the environmental protection of the Central European lignite basin.

Under the statement, the three countries will set up a working group to coordinate their environmental activity.

The statement was signed for Germany by Klaus Toepfer, minister of the environment and reactor safety, and for Poland by Maciej Nowicki, minister of environmental protection, natural resources and forestry.

CSFR Signs Environmental Agreement With Belgium

*LD2406161791 Prague CTK in English 0904 GMT
24 Jun 91*

[Text] Prague June 24 (CTK)—Czechoslovakia and Belgium signed an agreement on cooperation in environmental protection here last night.

The agreement also provides for cooperation in environment monitoring and joint solutions to the problem of waste.

A standing Czechoslovak-Belgian working group will be set up to coordinate cooperation.

France's TES Targets East European Waste Treatment Market

*91WS0306X Paris L'USINE NOUVELLE in French
7 Mar 91 p 44*

[Article by Philippe Andreani: "TES Burns for East Europe"; first paragraph is L'USINE NOUVELLE introduction]

[Text] Following its success in Czechoslovakia, TES, a specialist in the treatment of waste and sewage, is pursuing its offensive in East Europe. Its goal: to make 40 percent of its sales there.

While many people talk about it, Antoine Andraos is settling in. The president and general director of TES, a French manufacturer of installations for the incineration, crushing, and composting of waste and the purification of sewage, has just won a contract for 22 million French francs [Fr] with an East European country. The contract concerns two (nontoxic) waste incinerators—that will be delivered in the fall of 1991—for the Usti region in Czechoslovakia.

"The near 'duopoly' in France of the General Water Company and the Lyon Water Company in our sector forces us to adopt an export expansion strategy," remarks the CEO [chief executive officer] of the small, 20-person company located in Roanne (Loire). So he plans within the next two years to make 40 percent of his sales (expected to be Fr120 million in 1990) on the other side of the former Iron Curtain, because of those markets' potential for expansion in the realm of environmental services. As it happens, the Usti region is one of the most polluted in Europe.

Yet the deal was far from assured. As Dominique Delahoule, administrator and mission head at TES, explains, "after the purchase last July of the assets of the Frapy Company—which, after it filed for bankruptcy, was unable to honor the contract—we had to regain the confidence of the Czechoslovakians in order to resume discussions." The small Roanne company therefore promised to stay within the cost estimates and timetable initially set by Frapy.

It was worth it. This first contract opens up bright prospects for TES, which is actively seeking contracts in the Bulgarian, Polish, and Soviet markets. Indeed, Czechoslovakia is, together with the ex-GDR, the official Comecon supplier of machine tools to Soviet industry.

TES also wants to grow in southern Europe, notably in Spain, through projects for "green" thermal power plants. A contract estimated to be worth Fr180 million is moving in the right direction: the sine qua non condition for Antoine Andraos to attain his objective, which is to make over half of his sales in foreign markets.

Sweden, Soviet Baltic Republics Join in Study

*91WN0492B Stockholm DAGENS NYHETER
in Swedish 16 May 91 p 19*

[Article by Kerstin Hellbom: "Cancers Increase in the Baltic; Connection Between Mortality and Environmental Pollutants To Be Charted"—"First paragraph is DAGENS NYHETER introduction]

[Text] The number of lung cancer cases in men in Lithuania is nearly double as high as in Sweden. Lung cancer is the most common form of cancer among men, while the number is increasing drastically.

"Whether this is because of air pollutants or because of the bad Bulgarian cigarettes which Lithuanians smoke, we don't know," said Dr. Romualdas Gurevicius of Lithuania's cancer records office yesterday at the Science Academy's conference on the status of environmental medicine in Estonia, Latvia, and Lithuania.

Researchers know almost nothing about the effects of the polluted environment in the Baltic on people. Partly, this is because the methods for studying it have been poor, and partly because the available documentation has been censured. But now the "floodgates are opening," commented Professor Goran Pershagen of the Institute for Environmental Medicine.

'Mortality Atlas'

He is instrumental in the cooperative project which has been set up between Sweden and the Baltic states and which, among other things, will result in an "mortality atlas" for Estonia. The connection between mortality and environmental pollutants in various regions will be charted and Swedes will also be helping to do an investigation of radon in Estonian dwellings.

"We think we can see a relationship between severely environmentally-polluted regions and the increased frequency of allergies, chronic respiratory illnesses, cancer, and malformed fetuses. But before we have made thorough studies we can not establish the connection," he said.

On the other hand, it is very evident that the incidences of cancer are increasing. Estonia, and above all Lithuania, have good comprehensive cancer records whose development can be studied. In both countries lung cancer is on the increase among men. In Lithuania, fully 70 out of 100,000 men get lung cancer while only 40 out of 100,000 Swedish men get lung cancer.

"Air pollutants are certainly a factor, but so are our extremely harmful cigarettes, which have a tobacco content of over 30 milligrams while yours in Sweden have, at most, 15 milligrams," said Romualdas Gurevicius.

He reported also that the frequency of the skin cancer, malignant melanoma, is greatly increasing both among women and men, but that prostate cancer is in only fourth place among the most common types of cancer in men.

Hair Loss in Children

In order to deal with the destruction of the environment in the Baltic, industry must modernize, a process that will take decades. Over time researchers fear that constantly new, hidden "environmental bombs" will explode, followed by medical catastrophes, such as for example, the one in northeast Estonia in which children suddenly and inexplicably lost their hair.

When it was at its worst in the middle of the 1980's, eight percent of the children in the little town of Sillamae lost their hair. Today the figure has sunk to three percent. Large quantities of oil shale, a material which contains radioactive substances, are mined in the area. Researchers believe that the hair loss is caused by the radioactivity which is released.

Finland Weighs USSR Cleanup Aid for Kola Peninsula

*91WN0510A Helsinki HELSINGIN SANOMAT
in Finnish 26 May 91 pp C1-C2*

[Article by Ritva Remes: "Who Makes Decisions on Kola?"—first paragraph is HELSINGIN SANOMAT introduction]

[Excerpts] The Soviet Union needs help with its pollution problems. Aid is available, but matters are not progressing. There is a shortage of money, and there is no one to make the decisions.

With whom will Koivisto be discussing economic affairs in the Soviet Union—Gorbachev or Yeltsin?

Outokumpu General Manager Pertti Voutilainen considered the question.

President Mauno Koivisto will be visiting the Soviet Union in the second half of June. There are no political problems between Finland and the Soviet Union. This is why they will concentrate on economic relations during his visit.

Since the clearing system was terminated at the end of the year, trade between the two countries has dropped sharply. It is hoped that it will be replaced with a new system.

The renovation of the Kola nickel smelters will almost certainly be one of the individual projects on the agenda, and possibly also environmental projects in the Baltic area.

Voutilainen is interested in the Kola smelters, a 2-to-3-billion-markka project through which sulphur discharges on Kola would be reduced. Outokumpu has been negotiating for years with the Soviets on the renovation of the smelters.

Who Koivisto talks with, and about what, may be important from the standpoint of the Kola project.

"If I understand the situation correctly, Gorbachev and Yeltsin have agreed that the federation (Russia), rather than the central government (Soviet Union), gets its minerals as its property. The agreement was reached when Yeltsin got the miners to stop striking."

Under the Soviet economic reform, natural resources remain the property of the central government. If minerals were transferred to the Russian Government, whether the Kola project is continued may depend on Yeltsin.

Koivisto will meet with Soviet President Mikhail Gorbachev during his visit, but probably also with Boris Yeltsin, who by then will have been elected president of Russia.

Traditionally, Finnish and Soviet leaders would agree on important economic projects when they met, but the traditions have been broken. What was possible in Kekkonen's and Brezhnev's time may be impossible in Koivisto's and Gorbachev's.

Economic and social change has been turbulent at all levels in the Soviet Union. It can even be difficult—or altogether impossible—to provide aid. The Western countries received an object lesson with regard to this last winter, when the aid in the form of food sent by them rotted in the freight cars.

Finland has learned its lesson over the years. Voutilainen, too, has returned from Moscow with a bloody nose on many occasions. No progress has been made on long-planned projects. What remains of these projects are papers, fruitless negotiations, and reports.

In preparation for years now, the Kola project, or actually only the core of the project—cleaning up Kola's sulphur discharges—is nonetheless alive.

The project was supposed to be an example of Western aid that would alleviate the Soviet Union's environmental problems.

The Soviet Union proposed the Kola project originally.

The head of Gosplan [State Planning Committee], V.A. Anikeyev, put in a surprise appearance at a meeting of the Economic Commission in Leningrad in May 1985. He gave a talk on Kola's problems and proposed technical-economic cooperation. Its purpose was to solve the area's ecological problems and permit them to fully exploit Kola's raw material resources.

The Kola project was officially set in motion at a meeting of the chairmen of the Economic Commission in January 1986, at which a committee was appointed for Kola. It assembled a list on which there were 27 joint ventures. The biggest of them was the cleanup of sulphur discharges at the nickel smelters in Petsamo, Nikel, and Monchegorsk. Outokumpu planned to end smelting at Monchegorsk and concentrate smelting at Petsamo.

Over the years, the Kola project list grew shorter. The fading project did, however, gain new momentum when Prime Minister Harri Holkeri visited the Soviet Union in 1989. Holkeri brought back with him a list that had been reduced to three proposals. On the list were the renovation of the Nikel smeltery, construction of a drilling-machine factory at Tamrock, and an operational plan for mining apatite ore at Hiipina.

"Then Soviet Prime Minister Nikolay Ryzhkov was of the opinion that the ideas were good, that they would be implemented."

Project committee chairman Voutilainen was speedily sent to Moscow.

"I came back bleeding. The officials told me that Ryzhkov had made absurd promises. They couldn't do that."

According to the officials, the Soviet Union did not need help. It had its own plans: It would take care of the sulphur cleanup itself, the drilling machine factory would be moved to Alma-Ata, and apatite production would be modernized.

"A significant change occurred a year ago, when we went to Kola after a commission meeting. Holkeri and then commission chairman Stepan Sitaryan saw the whole miserable situation. Sitaryan was clearly shocked, and he was certainly influential in seeing to it that action was taken on the matter in Moscow," Voutilainen thought.

Last September, Sitaryan again came here to meet with Holkeri. Surprisingly, Second Deputy Prime Minister Vitaliy Doguzhiyev also came to Finland.

They announced to the Finns that the Soviet Government had decided to clean up the sulphur discharges in Nikel. An agreement between the two governments was produced.

Voutilainen was in a hurry again.

That same week, Outokumpu and the Norilsk Corporation, which owns the Kola smelters, reached their own agreement, in principle. Repair of the two smelters was reduced to renovation of the Nikel smeltery.

"Thus, decisions were generated, but the rest did not go as smoothly."

Surprisingly, Norilsk had no plans for, for example, the raw material basis: How much and what kind of ore would they get for Nikel?

Outokumpu did not get so far as to start preparations for its bid until April. About a week ago, the company submitted an interim report to the Soviets. The final bid on renovating the Nikel smeltery will be ready by this fall. Its preparation will cost Outokumpu 15 million markkas, and it will involve 30,000 to 40,000 man-days.

One's Own Sins and Those of Others

By all reasonable standards, Nikel should be renovated. It has been discussed for a long time. Yet, a Soviet internal decision reached at every level does not exist.

This is why anything is possible.

A week ago it was rumored that the Soviet Union had decided to pack up and leave: No pollution is created if the nickel is not smelted.

"There is a certain basis for this rumor. They considered different possibilities over there. Since there is no money, the ore could be sold to the world as is. Air protection promises would be kept without any cost to them."

"This is what they think. It is my opinion that that large a quantity of that kind of ore cannot be easily sold."

In Voutilainen's opinion, closing down Petsamo would be so great a social concern that it is impossible. The sulphur discharges must be taken care of. We hope they realize in the Soviet Union that we Finns are genuinely concerned about the environment, Voutilainen said.

"I've sensed that people in the Soviet Union have the idea that the Harri Holkeri administration had its own bickering. Now that there is a new government here, it has its own.

"Although the Environment Ministry has indeed become more agreeable than before, we should get the message through to the Soviet Union that continuity in terms of decisionmaking prevails here.

"I, of course, admit that I am reluctant to undertake to correct other people's mistakes when we have enough of our own. But Finland's environment is threatened more by external than by internal dangers. We will achieve more positive results by investing 1 million [markkas] in the Soviet Union than in Finland."

What Is a Loan, and What About Interest?

Finland is trying to provide the Soviet Union with bilateral aid, and it participates in international programs. Some of the projects receive direct aid from the state, and efforts are being made to arrange for loans and interest subsidies for some of them.

According to Voutilainen, it is in Finland's interest to provide aid for the Soviet Union so that the economies of at least those areas close to Finland will begin to prosper.

"In the present circumstances, we must certainly see to it that aid really reaches them. If we build a factory for the Soviet Union, we must see to it that it produces what it was intended to. The Americans have most clearly spoken of the need for assurances."

The difficulties in the Soviet Union stem from the fact that economic and social tumult has taken place rapidly. The changes have paralyzed the decisionmaking process.

In Voutilainen's estimation, the adoption of nine or 10 positions by the country's institutions are needed to make decisions. On the other hand, he is certain that the Soviets would buy even five smelters from Outokumpu if they had hard currency.

There is, however, a shortage of everything in the Soviet Union, and many reforms are in progress.

"Firms are told that the central government will not meddle in their affairs, that they may run their businesses as they wish as long as they get their own hard currency.

"Then another bigwig comes and says that you may not sell products to foreign countries directly. The state's orders have to be filled first. In practice, this means that nearly all production goes to the state, and no hard currency comes in. We're supposed to get it from Moscow, but there's none there, either."

"Then we say: O.K., if you don't have any money now, maybe you will at some time in the future. We'll extend you credit."

"In the firm they're puzzled. They don't know what credit is, what interest is, or how credit is repaid."

Foreign trade used to be concentrated in the Moscow foreign trade companies, and people were not trained to handle affairs elsewhere. They have no experience in, for example, handling hard currency.

"So, we say: Pay us in goods. They think that's a good idea, but Moscow says that that won't do. The goods are needed to fill state orders."

According to Voutilainen, this cycle is common to all those who do business with the Soviet Union.

Barter or goods exchange is open to them. It is officially prohibited in the Soviet Union, but it is the only kind of trade that functions at the present time, either directly or through chambers of commerce.

On the other side of the border, goods with monetary value are obtained from industrial complexes for truckloads of meat. [passage omitted]

When the [international] rush to provide aid was at its peak of enthusiasm last winter, the Finnish Government appointed a committee to coordinate Finnish aid efforts. Foreign affairs adviser Kalervo Hentila was appointed chairman of the committee.

The committee has completed its first report on the aid that is to go to the Soviet Union and elsewhere in Eastern Europe. The report covers both bilateral aid and aid that is to be provided jointly with other countries.

According to the report, Finland will participate in aid to Eastern Europe, totaling 1.2 billion markkas over a period of four years. This aid will be provided for cooperation on the environment, education and training, exchanges of trainees and experts, civic organization activities, and food production.

This year 274 million markkas in aid will be provided.

Furthermore, the state will participate in other financing and guarantee arrangements to the extent of 630 million markkas. No more than 300 million markkas may be approved for loans to subsidize interest payments.

The State Guarantee Center may grant no more than 3 billion markkas of interest subsidies for investments made in the Soviet Union for the environment.

Air and Water Cleanup

A report by five Finnish consulting firms that is being made in conjunction with officials in areas close to Finland will also be completed by June. According to Timo Makela, Environment Ministry project director, the Baltic program includes 16 different major projects, involving air protection and waste water treatment, among others.

The total cost of these projects will be about 10 billion markkas.

How they are to be funded is still open, and everything is being discussed: gift aid, international loans, guarantees, and interest subsidies. The principle involved is finding a limit that guarantees that the projects will be set in motion and that the Soviets will, for the most part, implement them themselves.

They are trying to get the first allocations into the national budget for next year.

It is anticipated that Finland's direct aid will all told amount to hundreds of millions of markkas over the next few years.

Projects Under Discussion

- **Nikel and Monchegorsk:** Sulphur discharges.
- **Hiipina:** Apatite mine discharges.
- **Kostomuksha:** Iron industry sulphur discharges.
- **Petrozavodsk:** Waste water, smoke discharges from power plants.
- **Pitkaranta and Segezha:** Cellulose and paper mill discharges.
- **Nadvoitsy:** Aluminum plant discharges.
- **Leningrad:** Construction of hazardous waste plant and four treatment plants. Waste water treatment for surface treatment plants. Treatment and utilization of waste from large hog and poultry farms.
- **Syasstroy:** Pulp and paper mill discharges.
- **Volkhov:** Aluminum plant discharges.
- **Svetogorsk:** Lumber industry discharges.
- **Narva:** Oil shale power plant discharges.
- **Tallinn:** Reduction of waste water volume. Cellulose and paper mill discharges.
- **Kohtla-Jarve:** Chemical industry discharges.

Finland-USSR Forest Study Pact Signed

91WN0510B Helsinki HELSINGIN SANOMAT
in Finnish 8 Jun 91 p 10

[Unattributed article: "Condition of Forests of Soviet Karelia, Leningrad, and Eastern Finland To Be Studied"]

[Text] Soviets and Finns are to begin cooperating in a study of the condition of the forests of Soviet Karelia, the Leningrad area, and eastern Finland. The prospective volume of pollutants and their impact on forest plant life and soil in these forests will also be studied during the five-year project.

The joint study was agreed on in Leningrad during negotiations conducted by Eljas Pohtila, the director of the Forest Research Institute.

There are many conspicuous sources of discharges in the Leningrad area. The industrial plants in Svetogorsk are the closest of them to the border. The most important individual targets in Soviet Karelia are Kostomuksha, Segezha, and Kondopoga.

Three Soviet research institutes will be participating in the project: from Petrozavodsk, the Karelia Science Center Forest Institute of the Soviet Academy of Sciences; from Leningrad, the All-Union Lesprojekt [Forest Project] venture, which is responsible for forest economy planning;

and, from Moscow, the All-Union Forest Resources Information Center. The two last-mentioned research institutes operate under the jurisdiction of the Soviet State Forest Committee.

USSR's Georgian Republic President Proposes Plan for Saving Black Sea Basin

AU1706182791 Tbilisi Radio Tbilisi Network
in Russian 1430 GMT 17 Jun 91

[Text] The following is the address by Zviad Gamsakhurdia, president of the Republic of Georgia, to heads of states situated in the Black Sea region, and to those who are concerned about the problems associated with the Black Sea:

The Black Sea is our planet's huge and unique [word indistinct] water reservoir, 90 percent of which is a mass of [word indistinct] hydrogen sulfide water. An intensive deposition of plant and animal organisms, more specifically, corpses, is taking place at the bottom of the sea. As a result, the content of hydrogen sulfide in the water is steadily increasing. The situation is further aggravated by the fact that industrial and sewage waters are discharged into the Black Sea. The surface of the hydrogen sulfide layer is dome-shaped, and, in its central part, the uppermost point is situated at a critical distance of 50 meters from the sea surface. In accordance with a tentative assessment, the quantity of hydrogen sulfide is about 2 billion metric tons. There exists a real danger that it may explode. The damage that may be caused by such an explosion will be much greater than that which resulted from the Chernobyl catastrophe, and will have a pernicious effect on the human environment not only in the Black Sea region but also worldwide. If the Black Sea water is purified, it may be possible to obtain and utilize precious chemical substances, including sulfur and hydrogen, the reserves of which amount, respectively, to 1.3 and (?0.1) billion metric tons. The price of one metric ton of sulfur on the international market is about \$1,000. Besides, there are [numbers indistinct] billion tons of fuel gas. Its recovered part, approximately 75 million tons, is sufficient to enable thermal electric power stations to annually produce 90 billion kilowatt/hours electric power. I call upon heads of states situated in the Black Sea basin and those who are concerned about the Black Sea problems to cooperate. I propose that a specialized intergovernmental institution for the protection of the ecological environment of the Black Sea basin be created under the auspices of the United Nations. The Government of the Republic of Georgia will ensure favorable conditions for the member states of the UN specialized intergovernmental institution and will take upon itself to host its headquarters. The Government of Georgia expresses its confidence that this proposal will be considered.

Agreement Signed on Arab-European Center in Cairo

91WN0522B Cairo AL-AHRAM AL-DUWALI
in Arabic 11 Jun 91 p 9

[Report by Wajdi Riyad]

[Text] New York—An agreement has been reached on the establishment of the first center for the environment and development for the Arab and European region. The center, which will be established in Cairo, will serve 22 Arab states and ten European states, including Spain, Cyprus, Turkey, Hungary, Czechoslovakia, all of the Arab League member countries, and the seven countries on the Danube. Its budget will be \$100 million. The annual return will subsidize developmental and environmental projects to fill the void in this area in the region.

Dr. 'Abdallah Nur, the chairman of the UN Program for Development, presented the idea of establishing this center to representatives of the Arab countries in a recent meeting held in Aleppo. Each of the countries agreed to the project without any opposition. In addition, five countries—Egypt, Tunisia, Algeria, Morocco, and Spain—offered to be the host country. A neutral scientific committee was formed to visit each of the five countries to evaluate their respective potentials to host the center in terms of equipment, personnel, training, and expertise. The committee returned to New York to submit its report to Dr. 'Abdallah Nur and determine the host country. Dr. 'Abdallah Nur told AL-AHRAM's environmental section

that this center is self-financed and not subject to any governmental agency. Dr. Mustafa Kamal Talabah, the chairman of the UN Program for the Environment, approved financing for the center and the beginning of the establishment of similar centers in Asia and America.

The new Arab center is designated CEDARE, an acronym for the Center for Development and the Environment of the Arab and European Region. The center will focus on four important environmental activities to counter:

- Desertification and the reduction of the soil level in 90 percent of the territory of the Arab world.
- Pollution in the Red Sea, the Mediterranean Sea, and the Gulf due to the passage of large oil tankers.
- The problems of cities crowded by migrants from rural areas and the effect of that on utilities, services, and development.
- The shortage of drinking water.

The center will also strive to help the Arab countries understand their problems and pressing environmental problems, and help them cope with the increase in their populations in the absence of an increase in natural resources.

REGIONAL AFFAIRS

Lusophone African Countries Meet on Environment

91P40327A *Luanda JORNAL DE ANGOLA*
in Portuguese 8 Jun 91 p 2

[Text] An official source reported to ANGOP [ANGOLAN PRESS AGENCY] that Angola will participate in the third UNEP-PALOP [United Nations Environment Program-Lusophone African Countries] and Equatorial Guinea meeting from 8-10 June in Sao Tome and Principe, in order to formulate a common environmental strategy.

The meeting, chaired by the United Nations Environment Program, has several objectives, including the integration of Lusophone African countries and development of cooperation among them. The source explained that these countries will attempt to establish a common ground for "overall initiatives" and for prioritizing various environmental issues and measures.

These proposals expect more aid from donors and envisage the formulation of a basic cooperation program among PALOP members "since we inherited from colonialism a weak environmental policy structure." The Angolan delegation will include representative from the Ministries of Agriculture, Rural Development, and Planning. The UNEP country representative will also attend the meeting.

The second meeting was held in Lisbon in December 1989 and was attended by Angola, Mozambique, Sao Tome and Principe, Guinea-Bissau, and Cape Verde—all members of the "five"—and Equatorial Guinea. Today, the date of the start of the conference, is World Environment Day.

MOZAMBIQUE

Cabo Delgado Reforestation Project Faltering

91P0330A *Maputo NOTICIAS* in Portuguese 6 Jun 91 p 3

[Excerpts] The six-year-old Cabo Delgado Pilot Reforestation Project (PPR) is now experiencing serious operational problems. Because of lack of funds the workers have not received their salaries since March.

The PPR, a project of the Ministry of Agriculture in collaboration with the Swedish Africa Recruitment Organization (ARO), promotes the planting of new trees to provide lumber and building materials, protect the environment, and provide support for communal villages. Documents on the project indicate that funds are also earmarked for training experts and forestry technicians either locally or abroad. At present the PPR occupies an area of approximately 130 hectares where a variety of trees are maturing, from eucalyptus, casuarinas, native cassias, and other shade-, firewood-, and lumber-producing trees.

According to forestry engineer Michael Oligaard, coordinator of the project in Cabo Delgado, the major problems are caused by delays in the approval of the national budget and by expanding activities without sufficient resources. Other problems include mismanagement of funds and other incentives that have been made available. Over the past years the Swedish nongovernmental organization,

ARO, the main backer of the PPR, has made available almost four million Swedish kronor, but this sum was depleted before the target date. Our source explained that a project accountant is being questioned by police for forging two signatures, those of the coordinator and his assistant, in order to remove five million meticals from the bank. Cases of embezzlement are many. "We fire workers for that reason and others just leave their job without any explanation." [passage omitted]

The source also added that uncontrolled fires are greatly affecting the project. From June to July of last year, an estimated area of 32 hectares was burned causing almost 70 million meticals in damages. Meanwhile the torrential rains in March 1989 completely destroyed the project's main barrage and its discharger, which will cost a lot to repair. According to the project's coordinator, Michael Oligaard, one of the plans for this year includes recultivation of the burned area and restoring the barrage in order to assure future production and distribution almost 15,000 saplings to the population residing in areas covered by the project.

Our interlocutor told us that this year's government budget is still not known, and added that a three-year 1.724 million Swedish kronor investment was proposed to ARO. The reforestation project aims to cover two districts, namely Mecufi and Pemba-Metuge. This year's priority tasks will be to distribute seeds and plastic containers to the farmers interested in planting seedlings and to train them in this area. Our source added that apiculture will hopefully be reintroduced this year with modern beehives and training in new techniques.

NIGERIA

Minister Enumerates Environmental Problems

91WN0493B *Lagos THE GUARDIAN* in English
15 May 91 p 2

[Article by Timeyin Uwejamomere]

[Text] Nigeria has eight immediate environmental problems, besides [a] share in the global environmental threat from the greenhouse effect, Major-General Mamman Kontagora (rtd), Works and Housing Minister, said yesterday.

The immediate problems are:

- excessive pressure on available resources, infrastructure and space due to unabated rural-urban migration;
- high rate of soil degradation, gully and coastal erosion and flooding resulting from non-judicious land-use practices and other natural causes, such as high rainfall;
- depletion of our natural forest resources through uncontrolled logging, tree felling and over-grazing;
- pollution of our surface and groundwater systems through indiscriminate dumping and disposal of soiled water, and

—bush burning and the risk of extermination of our indigenous wildlife and fish species, as well as uncontrolled hunting and fishing and related activities.

The others are:

- destruction of valuable agricultural land through bad mining practice, desert encroachment on vast agricultural land; and
- lack of awareness of the fact that natural conservation of resources (renewable and non-renewable) form the bedrock of sustainable development.

The minister, who presented a key-note address at a seminar on "Nigeria and the Environment Question," organized by the Green Environment Movement, (GEM), reiterated the government's commitment to the protection of our environment.

Steps taken to protect the environment, according to Gen. Kontagora, include:

- evacuation and exportation back to source of the 4,000 tonnes of hazardous chemicals dumped at Koko in 1987;
- Nigeria's leading role in the crusade against converting Africa and the Third World into the waste dump of industrialized countries, and
- promulgation of the Harmful Wastes (Special Criminal Provisions etc.) Decree 42 of 1988, which makes it a criminal act punishable by life imprisonment, to carry, deposit, dump, transport, import, sell, buy or negotiate in harmful wastes within the Nigerian territory and the exclusive economic zones.

Government Stepping Up Wildlife Conservation Efforts

91WN0493A Lagos *THE GUARDIAN* in English
21 May 91 p 10

[Text] Wildlife conservation could be defined as the scientific method of managing wild animals and their different habitats, aimed at their sustained, economic and aesthetic production for the enjoyment of the people and generations yet unborn. The management of wildlife is a multidisciplinary subject that requires diversified knowledge of animals, their behavior, and habitat to mention a few aspects.

Wildlife conservation started in Nigeria in the early 1930s and the first game reserves were established at Yankari and Borgu in 1956. The number of reserves increased to ten in 1967, and to 35 in 1975, the year Kainji Lake National Park was established.

There is rapidly increasing degradation and depletion of the country's wildlife resulting from land-use practices such as extensive irrigation scheme, dam construction and other human activities. These various activities had helped to wipe out many species of fauna and flora.

The question generally arises—why do we have to conserve wildlife and stop poor hunters from partaking of our God-given gifts? The answer is simple and can be found in

the opening sentence above. If we were to allow everybody to hunt wildlife as they wished, we will in no time be left with nothing, considering the demand for bush meat. The disappearance of our wildlife will simply mean the disruption of our very delicate ecosystem because, it is an integral part of the system.

First, wildlife is considered as a veritable source of food, protein, and medicine. It serves also as a source of recreation, education and scientific development when preserved in game reserves, zoos, laboratories and national parks. It is also money spinning when it is considered as motivation for tourists who come specifically to see them and bring in badly needed foreign exchange.

Wildlife conservation is a major source of employment to the local population and thereby prevents rural-urban drift. Most importantly, it helps in the stabilization of the ecosystem, which is disrupted, could bring about untold hardship to mankind. Their conservation also helps to increase the biotic and genetic diversity of our species which is very essential in avoiding the collapse of the different faunal species.

For quite sometime now, the government has been very seriously involved in conservation matters and no longer pays lip services to matters of conservation. Within a very short time, the present administration has established governmental agencies charged with the conservation of our natural resources and protection from degradation of our environment. The outstanding latest creations of the present administration include the Natural Resources Conservation (NRCC) which will soon be inaugurated and the Federal Environmental Protection Agency (FEPA). The government has also given support in all forms such as moral, financial, and infrastructural to support non-governmental organizations (NGOs) of which the Nigerian Conservation Foundation stands out. The Federal Ministry of Agriculture and Natural Resources using the services of its Federal Department of Forestry as an agent for the Federal Government, has a wide scope of operations. The department initiates conservation activities throughout the country, including desertification control, establishment of national parks aimed at the conservation of our different ecological zones with their species of plants and animals.

The government, in pursuit of wildlife and ecosystem conservation, has established four new national parks in addition to the existing one—Kainji Lake National Park. The other parks are old Oyo National Park, Gashaka-Gumti National Park, Cross River National Park and Chad Basin National Park. All these parks are all aimed at nature conservation. When added to the existing 35 five game reserve then one gets a clear picture of how much the government has done in providing the necessary infrastructure for conservation of our wildlife resources.

The government has also, in its efforts to conserve our wildlife, solicited and obtained the help of international organizations such as the World Wildlife Fund for Nature (WWF). International Union for the Conservation of

Nature (IUCN) with its different ramification, the International Council for Bird Preservation (ICBP), the Royal Society for the Preservation of Birds (RSPB) and the European Economic Community (EEC).

Apart from asking for, and getting the assistance of these international organizations, Nigeria is a signatory to some international conventions aimed at protecting and conserving wildlife, including the endangered species. Some of these include the Convention on Migratory Species (CMS), and Convention on International Trade and Traffic in Endangered Species (CITES). It is planned that we should soon sign the Ramsar Convention for the protection of water fowl and palearctic birds. With all these, the foundation has been laid for effective wildlife conservation. Also in pursuit of attaining adequate manpower for wildlife conservation, the government established a school of wildlife management for the production of intermediate level staff in New Bussa, and has a full fledged Department of Fisheries and Wildlife Management in the University of Ibadan.

Our insatiable appetite for bush meat consumption could be considered legendary. The demand on our wildlife as food cannot cope with what is obtainable in nature. Because of this, there is traumatic reduction in the number of available species left in the wild. People in the villages who used to hunt for subsistence have now turned professional and have even decided not to observe traditionally laid down rules for hunting. This has led to the extinction or near extinction of most of the available species. To reverse this trend of events, the Federal Department of Forestry has been encouraging its wildlife conservation division to go into multiplication programs aimed at providing in large quantities those species ranking very high on the bush meat preference list based on studies earlier carried out. Some of these projects include Guinea fowl, crocodile, snail, grass-cutter and giant rat projects. Because the biology and, especially the physiology and behavior of these animals have not been completely understood, some of these projects are still experiencing initial take off problems. It is our aspiration to complete the studies and make available for purchase by the public these much sort after wildlife species. This will help to reduce the pressure on them in the wild. When perfected these projects will go nation-wide and will, apart from aiding conservation, go a long way in satisfying our populations protein requirements.

Since the animals managed in the parks and game reserves fend for themselves, there is no money spent on feeding them. However, there is the need to maintain and sustain their natural sources of food by properly managing both the fauna and flora. This aspect takes time and money spent on monitoring, censuring, range management and provisions of adequate niches and food for the wildlife population.

There is the absolute need to educate the people on the need for wildlife conservation. One is often surprised when one listens to even the educated ones discuss conservation. You will marvel at their lack of knowledge on nature conservation. In this area, nothing has been done and a lot

need to be done. It costs money to provide audio-visuals/equipment to reach the people. The government should make it compulsory for conservation education to be introduced into the schools curriculum right from the primary school. For those who cannot go to school, the principles of conservation have to be taught them through various means, such as film shows with local lingo subtitle. To save costs teachers already employed by the government should be sent on summer schools to appropriate tertiary institutions, where they can be taught the basics of conservation education. On this issue, we would like to compliment the Nigerian Conservation Foundation, IUCN, RSPB and ICBP for their involvement so far in trying to lay a foundation for conservation education in Nigeria. Conservation education should be introduced in schools to what used to be known as Nature Study.

Poaching is also one of the greatest problems facing conservation in this country. The issue becomes irksome when people who should know get involved in active poaching, destroying our natural heritage as if they brought them about. This is simply because they can buy guns or the government has issued them some. Poaching is so serious now that Yankari—the pride of Nigeria in wildlife conservation—in a black shadow of its former self. Poachers go to the extent of killing the last animals in a species group, thereby bringing the species to instant extinction. They, however, do not realize that extinction is forever. The poachers not only destroy the animals, they also destroy the habitat—indeed the whole vegetation, by using unorthodox hunting methods such as bush firing, and clearance of vegetative cover. Their use of poison arrows being about the death of animals which in many cases die in zones where they (the hunters) cannot see them resulting in waste. They even kill pregnant females in their quest for money, and they have also killed some of our game guards in their normal callous ways.

Lack of adequate funding and in some cases no funding at all has mitigated seriously against conservation. The government alone should not be left to finance conservation activities in the country. This is because it cannot cope. The duty of conservation of our wildlife is not the function of the government alone. It should concern everyone of us living in or out of this country, multi-national corporations, big and small indigenous companies, rich individuals and others. They should contribute immensely to the proper conservation of wildlife in Nigeria. A percentage of each company's profit should be made available to the government for wildlife conservation activities or spent by the companies buying needed equipment, such as vehicles, two way radios, and development of infrastructures necessary for the conservation of our wildlife heritage. Anti-poaching operations are dangerous and costly and if we really intend to conserve whatever is left of our wildlife heritage, wildlife conservation efforts must be adequately funded.

Though the government has done well so far by establishing these reserves and national parks, it is still trying to

make money available for their operations. The government has recognized the need for implementing the following steps, which are aimed at curbing poaching and enhancing conservation:

- providing employment opportunities for indigenous living in close proximity to parks and reserves as an alternative to poaching;
- initiation of conservation education and public enlightenment campaigns targeted at different audience level, so as to get them to relate with the importance of wildlife conservation, and
- properly equipping the parks and training more conservation workers to enhance conservation activities;
- providing the facilities both in terms of materials and personnel for enforcing the different conventions which the country is a signatory to.

In conclusion, it can be stated that the need to conserve our wildlife heritage cannot be over-emphasized. The government from its pronouncements and activities so far is ready to build a solid foundation for the conservation of our wildlife heritage. The value and importance of our wildlife as source of food, medicine, scientific discoveries are enormous and tremendous. It is the duty of all of us to change our attitudes towards wildlife conservation and make sure it succeeds. Everybody should contribute both financially, materially or otherwise. Our wildlife must be protected for us and our children yet unborn. Let it not be thought of, what more is being said, that it was during our time that we lost this beautiful heritage. Always remember that extinction is forever and so we must conserve now!

SOUTH AFRICA

Minister Announces Plans To Resume Ivory Trade
91WN0480C Johannesburg *THE WEEKLY MAIL*
in English 9 May 91 p 13

[Article by Eddie Koch: "SA on the Horns of Ivory Dilemma"]

[Text] Environment Minister Louis Pienaar's announcement that South Africa plans to resume selling ivory on the international market next year is likely to antagonise environmentalists worldwide—especially as latest evidence shows the current ban on trade in elephant tusks is saving the animal from extinction.

But Pienaar may receive unexpected support from a team of English researchers, linked to Cambridge University's Ivory Trade Review Group, who argue in a new book that the survival of the African elephant will depend on methods that make constructive use of the ivory trade rather than attempt to combat it.

Most conservationists, local and abroad, agree that the outright ban on trade in ivory and other elephant-based products adopted by the Convention on International Trade in Endangered Species (CITES) in late 1989 had been surprisingly successful since coming into effect in January last year.

Crucial to the success of the ban has been a decision by Japan, a country which once consumed 40 percent of the world's ivory exports, to participate in the moratorium. The United States and the European Community have also slapped complete embargoes on the movement of ivory across their borders.

Demand in the main countries that consume ivory—Japan and Hong Kong—has been choked off and once-astronomical prices for the "white gold" has hit an all time low. In Hong Kong, once the world's ivory trade capital, prices have dropped by up to 50 percent and sales slumped to 3.7 tons of worked ivory, a tiny fraction of what was once a multimillion dollar industry.

"The ban has definitely been successful and we are seeing its effects in Kenya," says Director of Kenya's Wildlife Society Richard Leakey. "The price paid for ivory to the poacher from the first buyer in the chain has hit rock-bottom at about US\$2 and US\$3 (R5 to R9) a kilogram, down from US\$40 to US\$60 (R100 to R180) in 1989."

South Africa opposed the ban adopted by the CITES meeting in 1989 and entered a reservation against it. However Pretoria agreed to participate voluntarily in the moratorium for the whole of 1990 and extended this decision for another year.

Now Pienaar has announced, in a recent statement, that South Africa has taken the first steps to resume the marketing of ivory and other elephant products on the world market.

This is bound to raise the hackles of many of the conservationists who pioneered the CITES ban.

South Africa's delegates to the 1989 CITES conference pushed for a limited trade to be allowed to continue. This was greeted by vociferous criticism from some environmentalists who, armed with persuasive evidence that the South African Defence Force [SADF] had actively connived in the slaughter of thousands of elephants by Unita [National Union for the Total Independence of Angola] in Angola and that lax customs enforcement here allowed major smuggling syndicates to use South Africa as a conduit from Africa to the Far East, suggested that Pretoria could not be trusted in this matter.

This lobby will argue that South Africa's reentry into the market will revive ivory carving enterprises in the Far East, stimulate flagging demand for elephant tusks and reactivate the smuggling syndicates that appear to have gone into hibernation.

Proponents of a permanent ban will also ask, with good reason, how they can be assured that South Africa will never use a legal trade as a cover to distribute illegal ivory poached by Unita, Renamo [Mozambique National Resistance] or any other surrogate force it chooses to support in the region. New evidence that the SADF continues to send clandestine supplies of war materiel and supplies to Unita in Angola can only reinforce this suspicion.

But a team of researchers have argued in a new book entitled "Elephants, Economics and Ivory," that the ban

on ivory is having a detrimental effect on innovative conservation programmes in Africa that encourage local communities to participate in the preservation of wildlife rather than to engage in poaching for meat or money.

"The suppression of a community's rights to some exploitation of the local wildlife, or to share in any proceeds resulting from wildlife utilisation, may actually encourage local people to hunt illegally or to support outsiders engaged in these activities," say authors Edward Barbier, Joanne Burgess, Timothy Swanson and David Pearce.

The team, attached to the Wildlife Trade Monitoring Unit in Cambridge points to the Communal Area Management Programmes for Indigenous Resources (Campfire) projects in Zimbabwe, which provide revenue from sales of ivory for anti-poaching activities as well as local communities that suffer damages to their agricultural systems by elephants.

A number of other African states—including Botswana, Zambia, Namibia and the kaNgwane homeland in South Africa—have adopted similar schemes that promote the commercial use of wildlife resources in a sustainable way.

Revenues are shared with communities living on the borders of nature reserves. The people receive tangible benefits and they act as protectors of nature rather than promoters of poaching.

The book's authors argue that demand for ivory in the main consuming nations—the Far East as well as Europe and America—will drop by up to 50 percent because of the ban. But it is only a matter of time before new demand will be created in states such as South Korea, Taiwan and Saudi Arabia. These are non-CITES members that have been unable to pursue their desire to promote ivory carving industries because the price of tusks was too high—until the moratorium sent costs tumbling and made the industry viable in these regions.

"Sustainable populations of the African elephant, as with so many other endangered species, will depend upon the development of reforms which constructively utilise the trade, rather than attempts to combat it," the book argues. "institutional reforms to this end must be addressed now."

Pienaar and his cabinet colleagues will, no doubt, use similar arguments when they lobby foreign diplomatic and CITES delegates to consider favourably South Africa's plan to reenter the international ivory market.

Pretoria has formally asked CITES to remove South Africa's elephants from Appendix 1, the world body's list of endangered animals that may not be used for commercial purposes, and put them on Appendix 2, a group of animals that can be commercially utilised subject to international monitoring and regulations.

"If this proposal is accepted at the next conference of CITES parties, which will be held in Japan in March 1992, South Africa will again be in a position to market ivory and other elephant products internationally," says Pienaar.

But there is a major weakness in South Africa's position. Although it has a proud conservation record, most of this

country's game reserves exist on land that was expropriated from indigenous people or are policed by paramilitary rangers that are seen as part and parcel of apartheid's repressive institutions.

None of the official nature reserves, which include the biggest game parks in the world, have adopted community-based approaches to conservation. Experiments in this field have been left to small, financially strapped homelands like KaNgwane.

In the past, revenue earned by culling elephants in the Kruger Park and other reserves has been ploughed back into the maintenance of game parks. But none of the money has been used to compensate villagers who live in poverty on the borders or the reserves they once lived in. As a result, conservationists are greeted in black communities with either apathy or open hostility.

A group of international experts, appointed by the CITES secretariat and the World Conservation Union, will visit South Africa to investigate ways in which this country's elephant herds are being managed and to assess whether participation in the ban has had a detrimental effect on local conservation strategies.

Pienaar will try to convince them that South Africa's conservation effort, and its demonstrated ability to keep large and stable herds of elephant, depends on being able to sell the tusks of legally culled elephants on the world markets.

For these arguments to hold any force, he will have to go further and demonstrate that renewed ivory trading can benefit impoverished and traditionally oppressed communities.

As part of its efforts to abolish apartheid, Pretoria will have to find creative ways to redress the bitterness among rural people caused by colonial land expropriations. And conservation authorities will have to implement schemes that allow people living around their game parks to benefit from the profits they generate.

And Pienaar will also have to convince the international community that Pretoria's support for insurgent movements like Unita and Renamo, whose covert wars in Mozambique and Angola were bankrolled by illicit sales of poached ivory, has finally come to an end.

Council for Environment Needs Budget Increase

91WN0480G Cape Town *THE ARGUS* in English
19 Apr 91 p 7

[Text] The Council for the Environment would be unable to continue its activities efficiently unless its budget was at least doubled, the organisation said in its annual report.

The report, tabled yesterday, also voiced concern that little had been done to implement the Environment Conservation Act of 1989.

The council is the official body that advises the minister for the environment on policy.

The report said the council's budget was controlled by the Department of Environment Affairs. An amount of R328,000 had been budgeted for the 1989/90 financial year.

This figure "falls far short even for the current financial year" unless it was doubled, the report said.

The report said the council's committee was concerned that, after more than a year since its promulgation, little had been done to implement the Environment Conservation Act.

Government Highlights Nation's Water Crisis

Importance of Management

*91WN0481A Cape Town THE ARGUS in English
24 Apr 91 p 22*

[Text] Good management of resources is the answer to future water supply, says Minister of Water Affairs and Forestry Mr. Gert Kotze.

He said he was confident that President De Klerk's initiatives would improve relations between South Africa and its neighbors.

Botswana, Mozambique and Swaziland had maintained cooperation and liaison with South Africa on water matters through joint permanent technical committees.

Close cooperation had also been maintained with Lesotho which had resulted in benefits such as the Lesotho Highlands project, Mr. Kotze said.

Although there are many new water supply schemes being developed, and existing ones are being expanded and upgraded, the R5.5-billion Lesotho project has captured the nation's imagination.

One of the most ambitious multi-purpose water schemes being undertaken in the world, it took 40 years to plan and 108 contracts were awarded for its construction.

In terms of size, the project overshadows all previous water schemes, Mr. Kotze said.

Highest Dam

It includes construction of the highest dam in South Africa, as well as the longest tunnelling venture. It is designed to supply sufficient water to the Pretoria-Witwatersrand-Vereeniging [PWV] area well into the next century.

The first phase should be completed in 1996 and will feed South Africa with up to 18 cubic meters (the contents of an average swimming pool) of water every second through tunnels to the PWV.

It could take up to 30 years to complete all phases, but eventually up to 70 cubic meters of water a second should flow to South Africa.

Financing the project has been one of its most complex parts and international cooperation through the Development Bank of Southern Africa was an important and significant breakthrough.

Projects such as Lesotho Highlands were essential for the growing water needs of South Africa's people, Mr. Kotze said.

A rough estimate showed about nine to 10 million people would move to urban areas in the next few years. The additional sewage systems alone would cost about R4-billion.

Laws Amended

*91WN0481B Cape Town THE ARGUS in English
24 Apr 91 p 22*

[Text] Because of South Africa's relatively few water resources, they need to be managed closely, says to Mr. G.C. Claassens, director general of water affairs and forestry.

Warning how seriously the department regarded pollution of water resources, Mr. Kotze recently announced amendments to the Water Act. Sharply increased fines for pollution offenses have been accepted by parliament.

A first offender can be fined R50,000 (or two years' imprisonment), up from a maximum of R10,000 (or 12 months). For a second offence, a maximum fine of R100,000 or four years' imprisonment can be imposed.

Mr. Claassens said the new measures and the department's policy on pollution could leave no doubt of the government's firm stance on the issue and the punishment of offenders.

Alternative Sources

*91WN0481C Cape Town THE ARGUS in English
24 Apr 91 p 22*

[Article by Esann van Rensburg]

[Text] South Africa could face a serious water shortage within 25 years unless drastic steps are taken to prevent it, according to Mr. Gert Kotze, Minister of Water Affairs and Forestry.

South Africa's third-world population growth and deficiency in water could prove the most critical factors limiting development, he said in an interview.

With the water at its disposal, South Africa would not be able to provide for more than 80 million people.

Below Average

"We will either have to find more water or cut down on population growth."

South Africa was a water deficient country with an average rainfall of about 497mm a year, well below the world average of 860mm.

The cost of providing water would increase because of the greater distances it would have to be transported to areas of increasing demand.

Resources were also unfavorably distributed in relation to regions of economic growth, said Mr. Kotze.

The driest 70 percent of the country, which included the plateau, had only 11 percent of the usable water.

The variation in run-off differed from season to season and year to year, which meant greater volumes of water had to be stored for periods of drought.

Other negative factors included high evaporation caused by high temperatures and low humidity, the flat topography which exposed water to evaporation and the heavy silt load carried by rivers which was caused by sparse vegetation and fragile geology.

By 2020, South Africa would have to find alternative water resources.

He identified three possibilities:

—“The Zambezi River could prove a valuable source of water. But any scheme to lay a canal from the Zambezi through Botswana would be very complicated from an international point of view and very expensive. It is, therefore, not an option which is currently considered.”

—The second alternative was the stimulate rain artificially. Research was being done at Nelspruit and Bethlehem where there were high concentrations of moisture in the air. “The research is very expensive and could take many years to conclude but it is a real possibility.

“If we managed to bring to the ground less than one percent of the moisture that moves in over the Transvaal lowlands daily, we could probably solve all our country’s water problems.”

—The third possibility was desalination. A project at Bitterfontein in Namaqualand could provide experience leading to desalinating sea water.

Minister on Conservation

91WN0481D Cape Town *THE ARGUS* in English
24 Apr 91 p 22

[Text] People generally think the Western Cape has a lot of water. This is only partly true, says Mr. Gert Kotze, Minister of Water Affairs and Forestry.

“We will have to make a dramatic effort to provide water for Cape Town in the next century and all options will have to be considered.”

One may be the desalination of sea water.

Last week the levels in the four dams supplying Cape Town were reported to be at their lowest in several years.

Restrictions are looming in the area supplied by Clanwilliam dam which is down to seven percent. The town clerk of Clanwilliam said heavy rains would not solve the problem and the dam wall would have to be raised.

Mr. Kotze said Cape Town’s per capita use of water was slightly higher than elsewhere and people would have to learn to conserve water.

Minister Outlines Environmental Plans

Hydrogen Peroxide Plant

91WN0488A Johannesburg *ENGINEERING NEWS*
in English 17 May 91 p 4

[Article by Liesl Weber]

[Text] South Africa’s first hydrogen peroxide plant, producing a “green” chemical for the industrial and commercial markets, may not be the last.

Depending on market demand, the joint venture between explosives and chemicals industry (AECI) and CG Smith Sugar, Alliance Peroxide, could be building more of these multi-million rand plants in South Africa.

So claims general manager Keith Harris who tells *THE ENGINEERING NEWS* that the present market demand for hydrogen peroxide is 4,000 tons a year but has a capacity of over 10,000 tons.

“We are aiming to reach this in two years time by looking at, amongst others, the raw and waste water treatment, swimming pools control agents, and the preparation of hygienic fibers,” he reports.

The company is supplying the local market as well as the southern African countries.

“We do not expect to be competitive in the international markets, but will rather gear ourselves towards filling the gaps available in those areas,” reports Harris.

The R60-million hydrogen peroxide plant, capable of producing 10,000 mtpa, was officially opened by the Environment Affairs Minister Louis Pienaar at Umbogintwini near Durban.

Pienaar said at the opening that there was a growing potential demand for hydrogen peroxide as a substitute for chlorine.

“Consumers abroad are already beginning to boycott products such as disposable nappies if chlorine is used in their manufacture,” he said.

“I am convinced that the potential demand for this chemical as a substitute for chlorine is huge-locally as well as overseas.”

Hydrogen peroxide is said to be environment-friendly, emits no process effluents and decomposes into oxygen and water safe for human use.

The product is marketed under the name Hyprox and is rapidly becoming the preferred oxidant in the textile, paper, chemical and water treatment industries.

The plant, which incorporates the latest manufacturing technology which only a small number of global holders have had access to, was manufactured in two phases (*THE ENGINEERING NEWS*, September 1989).

The first phase involved the infrastructure, tank farm and dilution facility which enabled the plant to import and

receive the chemical in bulk, dilute it to a safe concentration and despatch it to customers equipped for bulk receipt.

Phase two comprised the construction of the production facility.

The plant's essential components of unit operation vessels, tanks, pumps and piping are made from 316 stainless steel or high purity aluminum.

A rigorous chemical and passivation procedure to prepare internal metal surfaces was necessary to prevent catalytic decomposition of hydrogen peroxide during manufacture.

Instrumentation includes a distributed control system (DCS) which permits the high degree of automation of the process and ensures operation efficiency.

The plant also has a comprehensive interlock safety and automatic shutdown system.

Alliance Peroxide has signed a licensing agreement with Apel Associates, an Ohio-based international consultant in hydrogen peroxide, for the production of the chemical.

Policy Envisaged

91WN0488B Johannesburg *ENGINEERING NEWS*
in English 17 May 91 p 14

[Text] The Government is taking steps to ensure that protective measures are being taken to protect South Africa's environment against degradation.

At the official opening of a R60-million hydrogen peroxide plant near Durban, the Minister of National Education and Environment Affairs, Louis Pienaar discussed some of the actions being taken.

Firstly, the matters concerning the establishment of an environmental economic policy were raised.

"The Council for Scientific and Industrial Research (CSIR) is conducting an investigation which is required to take the internationalization of external environmental costs into account when calculating the actual costs of production and services," reports Pienaar.

This was started in April this year and forms part of a programme by the Department of Environment Affairs to draw up an effective overall strategy to optimize all possible methods of environmental impact control.

"We are looking at a balanced approach of sustainable utilization so that the environment will not be left degraded," says Pienaar.

"Therefore mining operations could entail restoration of the surface and reintroduction of natural vegetation and farming could be restricted in sensitive areas to such use as to not contribute to erosion or desertification."

Secondly, the government is looking at "seriously misleading" environment-friendly labels in South Africa and is investigating a standardized mark.

"There are not products which are completely environment-friendly as usually either the container or the manufacturing process is unfriendly," says Pienaar.

"Guidelines and an authority are needed to test products and award a mark.

"The SABS was asked last year to investigate the introduction of a standardized mark and their first proposals will be made available later this month," he adds.

The last step discussed by Pienaar is the growing focus on recycling which has led government to recommend a new policy towards waste management.

The Department of National Education and Environment Affairs has recommended the "six R" waste management policy based on an investigation by the CSIR.

The first R has to do with reducing the waste stream, where using alternative and purer raw materials, alternative or better technology, process designs and quality control, may all reduce the waste stream.

Second is the re-use of products before they enter the waste; third is where the waste can be reduced by recovery of chemical, compounds and raw materials; and fourthly, South Africa is far behind Europe in the recycling of products for re-use.

"Once products have been re-used, recovered or recycled, it is necessary to regulate the disposal of the residue," reports Pienaar.

Benefits of Recycling Industry Described

91WN0480F Johannesburg *FINANCIAL MAIL*
in English 26 Apr 91 p 71

[Article by Brendan Ryan: "Turning Litter Into Rands"]

[Text] Living in the clutches of the throw-away consumer society, it is difficult to imagine a country where you cannot buy beer in a can and there is no such thing as a nonreturnable beverage container.

Such a country exists. It is not Cloud Cuckoo Land by Zimbabwe, which, when it comes to recycling and re-using scarce resources, shows up SA [South Africa] as being a nation of fat cat litterbugs.

Making that observation brings down a ton of statistics from the packaging industry to underscore SA's prowess in recycling. Furthermore, claims Owen Bruyns, executive director of the industry mouthpiece, the Packaging Council of SA, Zimbabwe is a bad example to hold up.

Recycling is big business in SA, employing about 6,200 people in more than 150 plants. It is rapidly getting bigger, with a number of projects under way by major companies as well as developments such as the waste extraction plants being built at dumps run by Johannesburg and Randburg municipalities. Judging by what's happening overseas, growing concern over the environment will ensure that this trend continues.

Zimbabwe has been short of resources since Rhodesia declared UDI [Unilateral Declaration of Independence] in

1965, creating an overwhelming motivation to conserve things such as bottles that we take for granted. At service stations and cafes, you normally cannot buy a soft drink to take away without handing in an empty.

I spent nine months there last year and, strange as it may seem, life carries on without nonreturnable beverage containers, plus there are major benefits. The roads are clean. So are the national parks. If you see a can or a dumpie lying along the roadside chances are it has been thrown there by a visiting SA or Botswanan tourist.

To my eye, SA's roads, cities and country areas are becoming increasingly littered despite the efforts of organisations such as Keep SA Beautiful and its various associates. That's debatable, says the organisation's chairman, Daan Kocks.

Bruyns questions just how serious litter is as an environmental issue. A survey by University of Cape Town researchers showed that professional ecologists rated litter only the 18th most serious of 19 environmental issues; the top three were population growth, water availability and soil erosion. Business leaders surveyed for the same study agreed with the ecologists on the first seven issues but rates litter as the eighth most serious.

The researchers suggested that this might be the result of public criticism of litter. They pointed out that only 24 percent of the business leaders polled opposed the statement "bottles used for beverages should carry a refundable deposit" and that many of those opposing it were in the packaging industry.

I can think of one other reason—littering can hit business right where it hurts by affecting the tourist trade. The Federated Hotel, Liquor & Catering Association of SA is trying to push the number of tourists visiting SA from 500,000 a year to 2m in five years. But where would you rather go on holiday, or shopping for that matter? Somewhere clean or where you trip over the litter?

Litter represents a careless attitude to the environment with serious ramifications on what some people eventually believe they can get away with—if you can chuck a beer can out of a car window why not dump your rubble in the Braamfontein Spruit and your effluent where you choose?

Recycling is one key solution and SA is doing a lot. Council statistics show that firms recycle about 11 percent of the total tonnage of plastics produced annually, compared with about two percent in the United Kingdom and United States. About 14 percent of glass, 21 percent of tin plate and 29 percent of paper and board produced annually in the country are recycled.

That's increasing and there is plenty of scope for improvement. Pulp and paper giant Mondi is putting in a R155m plant to recycle 85,000 t of newsprint annually and has set up a network—Paper Pick-Up—to collect the newsprint from households in 30 municipalities.

The packaging industry sees education as the other key solution. The industry policy is: packaging doesn't litter, people do, and it has thrown its weight behind projects

involving schools, community organisations, Keep SA Beautiful and recycling schemes such as Collect-a-Can and Bottle Banks.

Bruyns says the biggest waste disposal problem concerns paper generated by uses other than packaging, so why pick on the packaging industry in general and nonreturnable beverage containers in particular?

Well, for starters, it depends on where you get your statistics. The Cape Town City Council estimates that half the 40,000 t of street litter it collects annually is packaging. Next, beverage cans and bottles are certainly the most visible and long-lasting bits of litter along roads.

Bruyns says mandatory deposit legislation has been tried in one state in Australia and several in the United States and been shown not to work.

He says the main result is a sharp jump in costs to the consumer. The laws have dramatically reduced litter but haven't helped much to boost recycling.

Some SA bottlers run extremely successful voluntary deposit systems. SA Breweries marketing director Peter Savory says 75 percent of all beer sold is in returnable glass bottles—mainly the quart bottle, which is the cheapest way to buy beer.

Hennie Viljoen, president of the SA Federation of Soft Drink Manufacturers, says returnable packages—both plastic and glass—account for 70 percent of soft drink sales.

That being the case, surely it cannot be that difficult to widen the returnable net and provide similar incentives to get back the cans and dumpies? No, say industry executives, who maintain that the administration logistics and hassle for retailers and bottlers are too great.

"We are happy with our produce mix, which runs completely counter to the trend overseas where, in the United States 80 percent of beverages sold are in nonreturnable containers," Viljoen says.

The trouble is that litter education programmes are long term—our children should be much more litter-conscious than we are—but meanwhile the cans and dumpies are piling up.

The public needs to be more litter-conscious and should support the bottle bank, collect-a-can, paper pick-up and other recycling schemes, but there's more that should be done to sort this one out by the packaging industry. Greater financial incentives are needed in one form or another to convince the public to bring those nonreturnable cans and bottles back for recycling or choose returnables over nonreturnable packages in the first place.

Waste Handling Facility Available to Atomic Energy Corporation

91WN0480B Johannesburg ENGINEERING NEWS in English 12 Apr 91 p 8

[Text] A Polyethylene waste handling plant has been designed for the Atomic Energy Corporation [AEC] of Pelindaba, by Howden Energy Systems of Johannesburg.

The plant is required to reduce the volume, by incineration, of contaminated polyethylene sheets in which AEC plant components are wrapped when they are removed for maintenance or repair purposes.

The sheets are packed and sealed in drums after use.

The proposed plant, with 97 percent local content, was designed in collaboration with a hazardous waste technology company in New Zealand, working closely with AEC engineers.

The design has a pyrolytic process section which has a primary incinerator chamber with air fan and secondary and tertiary chamber burners; a radiant duct heat exchanger, bag filter, final filter, large ID fan which maintains negative pressure in all of this equipment to prevent leakage of atmosphere; and a packed tower.

A semiautomatic system has also been designed to retrieve the drums packed with contaminated polyethylene, conveying them to a hopper at the loading bay, decanting the contents of the drum into the hopper which is then inverted to load the polyethylene into the incinerator.

The polyethylene waste is fed into the incinerator by means of an hydraulic ram.

The loading cycle is designed for eight hours and the incinerator for 16 hours. Its capacity is 96 kg an hour.

The primary incinerator chamber, which is the gassifier, has three hearths at different levels, stepping down to the ash disposal outlet. An hydraulic ram on each hearth forces the waste down the steps, turning it over as it does so which facilitates burning.

An inadequate supply of oxygen in the incinerator leads to the gassification process.

The very fine ash is discharged into specially sealed containers.

The 16m³ primary incinerator chamber will be fabricated from mild steel and lined with refractor brick as are the secondary and tertiary chambers.

The radiant duct is to be made of 310 stainless steel which resists corrosion by the condensate.

The system is a well proven one and is widely used in South Africa.

Air Pollution Control Plant for Richards Bay
91WN0480I Johannesburg *ENGINEERING NEWS*
in English 19 Apr 91 p 3

[Text] An air-pollution control plant to clean up the fumes from 24 aluminium reduction cells is to be built at Alusaf's Richards Bay smelter.

A contract to design, install and, by October, commission the environmental plant has been awarded to ELB Brandt of Germiston assisted by overseas principal Hosokawa Mikropul of Germany, which has international experience on similar applications.

The process involves the introduction of alumina powder from a storage bin silo into an air slide, which in turn feeds into the raw off-gas stream extracted from the aluminium reduction cells, via a venturi reactor, where gaseous and particulate fluorides are absorbed by the fresh alumina.

The gas and particles enter four modules of a bagfilter, made up of 1,600 bags which filter the particles from the contaminated gas stream.

When maintenance is required, the filter plant can be operated with one unit off-line.

The clean gas is emitted to the atmosphere via induced draught fans up a 25m chimney.

Some of the collected product of enriched alumina is then recycled within the circuit of the bag filter to reduce the use of fresh alumina to an optimum condition.

The remainder is returned to the fresh alumina silo by means of an air slide and an air lift to the top of the silo. Ultimately, the enriched alumina is fed back to the reduction cells by dense phase pneumatic conveying.

Transkei Dune Strip Mining Plan 'Shelved'
91WN0480H Cape Town *CAPE TIMES* in English
20 Apr 91 p 3

[Text] East London—Plans to strip-mine sensitive dune forests on the southern Transkei coast have been shelved for the present, says the manager of Rand Mines Environment Protection Department, Mr. Digby Wells.

The feasibility of mining titanium in the Nxaxo and Kobonqaba forests has been under investigation by the company, which has already completed the first phase of its studies.

Mr. Wells said the plans had been shelved because of "legal niceties" relating to the Transkei mining lease and a temporary delay in a feasibility study which was to be undertaken for the government by the Development Bank of South Africa (DBSA).

The government mining engineer at the Transkei Mining Corporation (TMC), Mr. John Carr, said there was still mining legislation to be "tied up" before the project could be considered by the government.

Mr. Carr said the operation could "change the whole face of the Southern Transkei" in a positive way.

Conservationists disagree. The proposed mining and subsequent destruction of the indigenous forests have stirred opposition from conservationists.

Saldanha Bay Fishing Industry Declining
91WN0480E Johannesburg *CITY PRESS* in English
28 Apr 91 p 28

[Text] Thousands of workers at Saldanha Bay and other places along the Atlantic west coast will lose their jobs this year as the fishing industry declines.

As one drives through the part of town until recently reserved for white people the new sight of coloured children frolicking in the cool waters of the bay gives no hint of the impending disaster.

But in the part of the town where coloured people have been forced to live there is anger and depression.

According to the local branch of the Food and Allied Workers' Union (Fawu), which represents the workers, the crisis has been caused by years of mismanagement.

Contributory factors, claims the union, include the lack of adequate legislation against gill-net fishing; little control over foreign vessels fishing in South African waters; and mismanagement of the fish quota system over the years, resulting in over-fishing.

The worst offender is the invisible gill-net, which snares everything in its path.

Trade unionist Gertrude Myburgh said Taiwanese trawlers, in particular, haul fish into the gill-nets and then toss overboard what they don't want.

"Those fish not wanted by the trawlers have already died by then," she said.

"The government has never stopped the catching of juvenile crayfish, which need eight years to grow to full size, resulting in a depletion of the crayfish resource.

Now the country stands to lose millions of rands in export trade as crayfish stocks dwindle.

The Minister of Environmental Affairs, and former administrator general of Namibia, Louis Pienaar, denies the crisis in the industry has been caused by over-fishing.

He said the cause is "probably unfavourable environmental conditions."

"Some constraints on foreign fishing inside South Africa's waters are now being put into effect," he added.

The problem is that the government is also applying strict quotas to local companies and, together with shrinking stocks, it has sounded the death knell for large parts of the industry.

For fish worker Hester Basson it means the end of her livelihood.

She was 13-years-old when she began her employ with the Saldanha Bay Canning Company.

Forty-nine years later, as senior worker in her fish plant and the oldest member of staff, she will receive nothing more than the eight weeks of salary being offered to those who will be permanently laid off.

There was a time when she lived in a house provided by the factory for which she paid no rent.

Then the area was declared a white area. The factory houses were demolished and the workers were moved into council houses where they had to pay rent.

But Hester is lucky in that she has established herself over many years. The rent she pays to the council qualifies her to eventually own her house.

Hester will soon get an old age pension. But younger workers face a bleaker future.

Some are even taking their children out of school in the hope that they may find some work to supplement the family income.

Some take the little money they have and spend it on drink. When times were better and they worked a full week, they earned between R167 and R180.

As the crisis in the industry deepens, there is a fear Saldanha Bay will become a "ghost town."

For those few families who have their own little boats there is still some way out. They sell their catch among the community and earn a few cents.

But for the vast majority, alternative work possibilities are virtually non-existent.

Said Hester: "We are all very uncertain about the future. We do not know what will happen to us. Everything is developed now."

But that development could spell the end of the coastal fishing industry and its culture.

Hester Basson knows, it is not just the fishermen who will suffer, but also the many women who stand ready to receive their catch in the fish factories all along the west coast.

It is these women who will find it increasingly difficult in the months ahead.

Cape Beach Pollutants Exceed EC Standards

91WN0480D Cape Town CAPE TIMES in English
7 May 91 pp 1, 3

[Text] Pollution levels ten times that of safety bathing standards have been found at Mouille Point—while in False Bay a count eight times the recommended safety level was found.

This was according to a six-monthly report to the City Council submitted yesterday.

Graaff's Pool, a males-only rock pond on the Sea Point beachfront, was included among popular bathing spots that are polluted by faecal coliforms.

Faecal coliforms are found in human and animal faeces and indicate the likely presence of harmful viruses and bacteria.

Bathing safety is measured against the European Community standard which prescribes that one should not find more than 100 faecal coliforms in 100ml of water.

In 34 spots monitored by the City Council, it was found that:

—Mouille Point beach had winter levels of over 1,000.

—Granger Bay had winter levels of over 700.

- At the Mitchells Plain wastewater outlet, levels of over 800 were measured in winter, and over 200 in summer.
- Just over double the guideline level was measured at Graaff's Pool last winter, and Rocklands had just under double the guideline figure.
- Other places where the EC guidelines were exceeded in winter were Muizenberg station, Muizenberg Pavilion and the Zeekoevlei outlet.

Yesterday Assistant City Engineer Mr. Henk Beekman said excessive winter levels at Three Anchor Bay, Rocklands and Graaff's Pool were caused by storm-water run-offs and were not related to the broken sewerage outfall pipe at Green Point.

Mr. Beekman said extra storage ponds were being built to solve the pollution problem at the Mitchells Plain outlet.

—Yesterday Graaff's Pool regulars pooh-poohed the high coliform count in their favourite spot—while one added that he would keep his "mouth shut" while swimming in future.

Sprightly Mr. Elias Epstein, 87, who described himself as "the Minister of Naked Affairs," said he would in future simply "judge the water on the day."

Mr. Epstein, who said he had been visiting the pool and enclosed area for over 70 years, expressed surprise at the report saying he was previously unaware of any potential health threat.

"If it looks slimy I won't go in now—but the tide in winter generally cleans everything out."

—A new 1.7 km Green Point sewage outfall pipe is under construction at a capital cost of R30 million and operational cost of R2.5m a year. It is due for completion early next year.

Minister: False Bay Pollution 'Under Control'
*91WN0480A Johannesburg ENGINEERING NEWS
in English 5 Apr 91 p 3*

[Text] Pollutants discharged into the sea in False Bay by way of river courses is under control, says Water Affairs and Forestry Minister Gert Kotze.

The minister responded to questions put to him in Parliament by National Party MP for False Bay Adriaan Jordaan concerning, among other things, his department's involvement in monitoring pollution levels in the sea and whether research is being done on the long-term effects of this type of pollution.

"The Department of Water Affairs and Forestry exercises control over point sources of pollution discharging into the sea in False Bay, or into estuaries, rivers and streams which flow into the Bay.

"Ongoing monitoring is also being done in the surf zone at areas within the jurisdiction of the municipality of Cape Town by the City Medical Officer and the Western Cape Regional Services Council," he said. The minister stated that the quality of the effluent from point sources, as well

as the point and manner of disposal, within the False Bay catchment area and the Bay itself, are controlled.

A research project to investigate the extent of urban storm water pollution and possible management strategies, is being done by the CSIR [Council for Scientific and Industrial Research] at the request of the department and by consultants funded by the Water Research Commission.

"On the initiative of the Department of Water Affairs and Forestry, a coordinating committee was established in December last year to address the problems surrounding storm water runoff to False Bay. Representatives of all local authorities situated in the catchment area of False Bay, sit on this committee, which functions under the chairmanship of the City Engineer of Cape Town, Kotze said.

Anglo American Charged in Water Pollution Case
*MB2006163091 Johannesburg SAPA in English
1614 GMT 20 Jun 91*

[Text] Johannesburg June 20 SAPA—Anglo American Corporation on Thursday said it had attempted to clean a stream and a dam near Barberton, in the eastern Transvaal, which it allegedly polluted with high levels of zinc and other metals.

In a statement in Johannesburg, the corporation said it was "engaged in a major, corrective project approved by all parties and costing more than R[rand]2 million" after it became aware of the pollution from its Bien Venue mine.

Earlier in the day, the Department of Water Affairs announced it has charged Anglo with negligence and pollution. The case is due to be heard in Nelspruit on June 26.

It was claimed the Bien Venue mine, owned by Anglo and situated in the catchment area of the Crocodile River, discharged a high concentration of zinc and other heavy metals which resulted in a stream and a dam, owned by Mr. Luke van Johnston, being polluted.

The stream and the dam were polluted to such an extent that the water turned yellow, all the fish in the dam died and were rendered unfit for household and animal drinking purposes. [sentence as received]

The charges being put to Anglo are that during the period 1985 to 1989, the corporation unlawfully and negligently tipped waste rock and other excavated material downhill towards and into the stream and that Anglo allowed rain and other water to seep through the rock-dump into the stream, thereby polluting it.

It was alleged that Anglo also failed to cause all mineral, tailings and waste-rock dumps to be designed, constructed or modified in such a way that all rainwater precipitating towards it, be prevented from flowing into the stream.

Specialists believe that it will take a considerable length of time before the dam will be rehabilitated to its original status, even if remedial steps are implemented.

In their statement, Anglo said they would not comment on the case until after it had been heard. "In our opinion, it is in contempt of court to comment on the pending case at this stage."

The corporation said it would comment after the case had gone before the court.

Qu Geping Analyzes China's Policy, Investment for Environmental Protection

91WN0464A Beijing HUANJING BAOHU [ENVIRONMENTAL PROTECTION] in Chinese No 3, 25 Mar 91 pp 2-5, 22

[Article by Qu Geping [2575 2706 1627], director of the State Environmental Protection Bureau: "Basic Analysis and Assessment of China's Environmental Protection Investments and Policies (Part One)"]

[Text] Since the First National Environmental Protection Conference in 1973, a long period of exploration and practice has enabled us gradually to formulate strategic ideas for environmental protection that conform to China's national conditions and we have established an initial environmental management system. During this process, we were always concerned with the issue of investments in environmental protection because our success or failure in dealing with this question will eventually determine the success or failure of our work to control pollution and improve the environment. Everyone has a relatively unanimous understanding of this. There has always been disagreement, however, concerning the investment issue. One view calls for the state to provide money to solve pollution problems while another calls for reinforced management to make all areas, and polluters in particular, invest more to solve pollution problems. In regard to this question, we must begin by summarizing experiences in China and foreign countries, unify understandings, and find ways to solve the problem.

Much work will have to be done to achieve the goals of the Eighth 5-Year Plan and our objectives for the year 2000. Capital implementation for environmental protection is a decisive link and we must conscientiously study this question.

I. Changes in Environmental Policy Ideology

China's environmental management ideology has developed continuously during practice in environmental protection. Overall, it can be divided into two phases. Phase one was from 1973 to 1981. Environmental management during this period was centered on organizing pollution control. Phase two was from 1982 up to today. Profound changes occurred in environmental management ideology during this period and we began to understand that, given China's present economic and technical levels, relying on large investments and adopting advanced technology to solve environmental problems was unrealistic. We must focus our efforts on reinforcing environmental management and use management to promote pollution prevention, and we must solve several environmental problems that arose from poor management. Changes in environmental management ideology have been followed by changes in China's environmental protection investment policies, which fall into two phases covering similar time periods.

Phase one ran from the conclusion of the First National Environmental Protection Conference in 1973 to the early 1980's.

The First National Environmental Protection Conference held in 1973 examined and approved the "32" character environmental protection work principles and "Certain Stipulations Regarding Protection and Improvement of the Environment". After the conference, the State Council ratified and passed on the conference reports and stipulations, and it pointed out the need to formulate rapid control programs to deal with existing pollution in cities, rivers, ports, industrial and mining enterprises, and business units in stages and in groups and the need for capital, materials, and equipment guarantees. It also stipulated that the duties of environmental protection departments were: unified planning, comprehensive arrangements, and organizing implementation, supervision and inspection. Restricted by the centralized planning system and levels of understanding of environmental problems at the time, China's environmental protection work focused on controlling the "three wastes" [waste water, waste gas, and industrial residues] and on "organizational implementation" of comprehensive utilization. Investments for control basically relied on state financial budgets and arrangements were assigned via industrial departments, provinces, and municipalities under the unified leadership of the State Council's Environmental Protection Leadership Group. According to incomplete statistics, state finances arranged 504 million yuan in control capital from 1973 to 1981. Control was carried out for several pollution sources that caused severe pollution and had powerful social effects. Definite achievements were made in pollution control in the Bohai Sea and Huang Hai, Guanting reservoir, Yaer Hu, and Songhua Jiang. Overall, however, state finances had to provide money and requests were made to increase the proportion of investments each year during this 9-year period, but the figures achieved each year were limited and the proportion was very low, far below actual requirements appropriate for environmental protection.

Phase two ran from the early 1980's to the present.

In the late 1970's, pollution was growing and there were limits to the money that the state could provide, so it was like trying to put out a burning cartload of brush with a cup of water—totally inadequate. Compelled by this situation, we began to understand that simply relying on the single channel of state finances could not solve our environmental protection capital problems and that the burden would become even heavier. At the same time, this way of doing things also concealed the fact that enterprises, departments, and local areas were shirking their responsibility to prevent pollution, which was not conducive to close integration of solving environmental problems with economic development. The 1979 "Environmental Protection Law of the People's Republic of China (Trial)" formally set forth the policy of "those doing the polluting being the ones who control it". Through propaganda and preparation, China's environmental protection investment policies entered phase two in the early 1980's. This involved using laws, administrative regulations, standards, and many other policies to clarify environmental protection responsibilities and gradually open up multiple investment channels. The main force in investments gradually became more diversified. The "three together" proposed

in 1983 were matched up with several administrative stipulations after 1980 and continually reinforced. The State Council's "Provisional Methods for Requisitioning Pollutant Discharge Fees" promulgated in 1983 were implemented throughout China. The State Council's "Stipulations Regarding Integration With Technical Upgrading To Prevent Industrial Pollution" were announced in 1983. The State Council's "Decision on Environmental Protection Work" issued in 1984 clarified eight capital channels for environmental protection. Subsequently, seven ministries and commissions issued a joint "Notice of Stipulations Concerning Environmental Protection Capital Channels" which provided concrete stipulations for each type of capital channel. In 1987, the pollutant discharge fee was changed from uncompensated utilization to compensated utilization.

This process shows that major changes have already occurred in the structure of China's environmental protection investments. They have changed from a single channel to multiple channels and from a single focus to multiple foci. It should be pointed out that these changes were

the financial power of local areas and enterprises. This changing situation forced us to change our environmental protection investment policies and created the conditions for us to make reforms. The main direction and content of the reforms was a shift from requesting money out of state finances to requesting money from units which create pollution, mainly polluting industries and enterprises. Let's look at the situation in other countries. First, all nations of the world have implemented "polluter responsibility principles" and there are usually strict limits on state subsidies to polluters. Some data indicate that state financial subsidies only account for 5 to 20 percent of private enterprise environmental investments. This is roughly the same as China's policy of "those doing the polluting being the ones who control it". Second, increased environmental investments in all countries are a product of gradual tightening of environmental laws and gradually rising environmental standards. This is a different approach from our methods of reinforcing management and promoting increased investments, but the results are equally satisfactory.

Since the early 1980's, as our national economy became

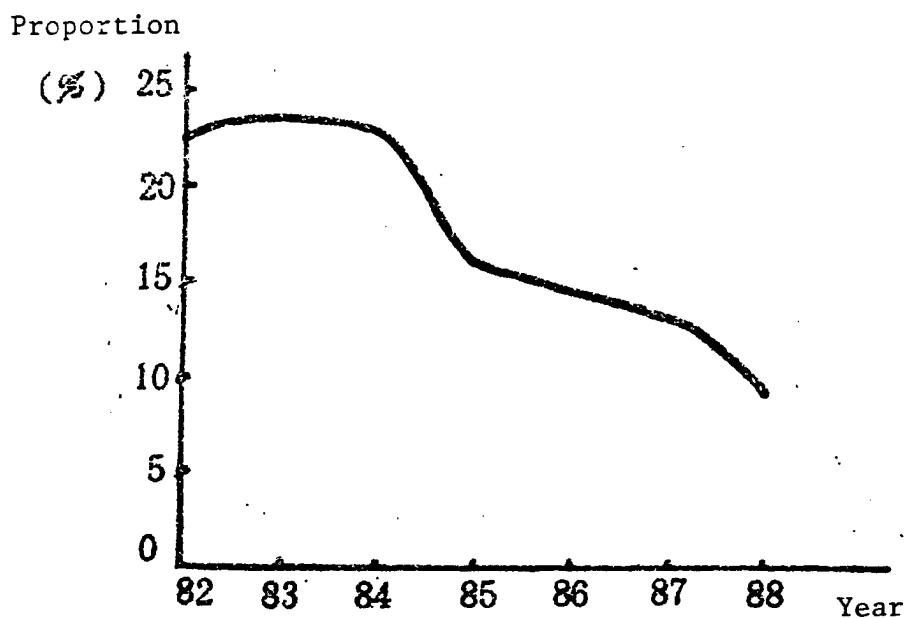


Figure 1. Investments in State Budget as Proportion of Total Social Investments in Fixed Assets

carried out against a background of reform of China's economic system. First, reform of the financial system and investment system implemented "dividing up the stoves to eat" in the financial administration and the focus and patterns of investments were diversified. Second, the decision making rights of enterprises were expanded and enterprises gradually turned into economic entities with responsibility for their own profits and losses and independent administration. Third, there was a trend toward a declining proportion of China's financial income as a part of our GNP, an obvious reduction in the proportion of total social investments in fixed assets accounted for by investments within the state's budget (see Figure 1), and rapid growth in

stronger and environmental protection investment policies changed, there have been substantial increases in China's environmental protection investments. Total rose from 1.9 billion yuan in 1980 to 10.25 billion yuan in 1989, a more than 4-fold increase. Investments as a proportion of our GNP have risen from 0.39 percent to 0.64 percent.

Practice has proven that the basic direction of strengthening management, using laws, standards, and policies, and using multiple channels and forms to guide and implement environmental protection investments is correct and that the path we have taken is the right one. Otherwise, looking to the single channel of seeking money

from the state could have led us into a dead-end street and the situation of growing environmental protection investments would not have appeared during the 1980's.

II. Sources of Environmental Protection Investments

From an economic perspective, inputs are made to obtain outputs. The fewer the inputs and the more the outputs, the better the economic results. Investments in environmental protection are different from normal administrative investments. With the exception of a small part of the investments producing profits (such as investments in comprehensive utilization of the "three wastes"), most investments have public benefit qualities and basically are unprofitable. Of course, if we view this from the perspective of social benefits, ecological benefits, and long-term benefits, there are substantial benefits from investing in environmental protection. Survey research indicates that the ratio between environmental protection inputs and outputs is 1:6. However, people usually do not see the problem this way and usually production managers are not consciously willing to spend this money. Thus, an obvious characteristic of both state investments and enterprise investments is that most of them are coerced or induced by state plans or laws, standards, administrative orders, and other measures and economic stimulation measures. This is the case in countries dominated by a market economy as well as in countries dominated by a planned economy.

China is a socialist country and most of our enterprises are publicly owned. From the perspective of overall national interests and the people's long-term interests, the goals of environmental protection and production development are identical. Thus, we must use administrative, legal, and economic measures to make enterprises control pollution and we must use education to guide them in focusing on comprehensive and long-term interests and consciously reinforced pollution prevention work.

Since the early 1970's on the basis of summarizing practice and experience and absorbing and digesting environmental management ideology from foreign countries, we have gradually formed several environmental economics principles, which are:

1. The principle of focusing on prevention and strictly controlling the occurrence of new pollution;
2. The principle of solving pollution problems during technical upgrading;
3. The principle of polluters bearing the cost of preventing pollution;

4. The principle of differential treatment for new and old polluters (strict for the new, less strict for the old);
5. The principle of providing specific economic preferences for controlling pollution;
6. The principle of using comprehensive rectification and control for concentrated control of pollution in urban areas;

Guided by these principles, we have formulated a series of policies that have opened up eight environmental protection capital channels and gradually stabilized them in the form of laws and regulations, standards, and plans. Based on the principle of a focus on prevention and differential treatment for new and old polluters, we have stipulated that capital construction in industry must implement an environmental impact report system and "three together" system to strictly control the occurrence of new pollution. Based on the principle of using the technical upgrading process to solve old pollution source problems, we have estimated the pollution debts of old enterprises and stipulated that at least 7 percent of renewal and upgrading capital must be used for pollution prevention. Based on the principle of polluters bearing the cost of prevention, we formulated a pollutant discharge fee system. Based on the principle of providing definite economic preferences to control pollution, we stipulated that profits from comprehensive utilization products would not have to be turned over to higher authorities for 5 years, that applications could be made for preferential loans to control old pollution sources, and that pollution control projects could be exempted from building construction taxes. Based on the principle of concentrated pollution control, we suggested that a portion of urban construction fees be set aside for concentrated pollution control in urban areas. In addition, to strengthen environmental management, all levels from the national to the local have made appropriate increases in funding for construction of environmental departments themselves. We have also reinforced international cooperation over the past several years and utilized foreign capital, including loans and various types of gifts.

Among these capital sources, five types of capital are the most important. They are capital construction, urban construction, technical renewal and upgrading, pollution discharge fees, and bank loans (see Figure 2).

Since the 1980's, there has been a substantial increase in the amount of environmental protection capital raised through these capital channels and it has risen substantially as a proportion of GNP and total social investments in fixed assets (see Figures 3, 4, and 5).

At the same time, all types of investments have increased to varying degrees and there have been definite changes in the structure of capital sources (see Tables 1 and 2 and Figures 6 and 7).

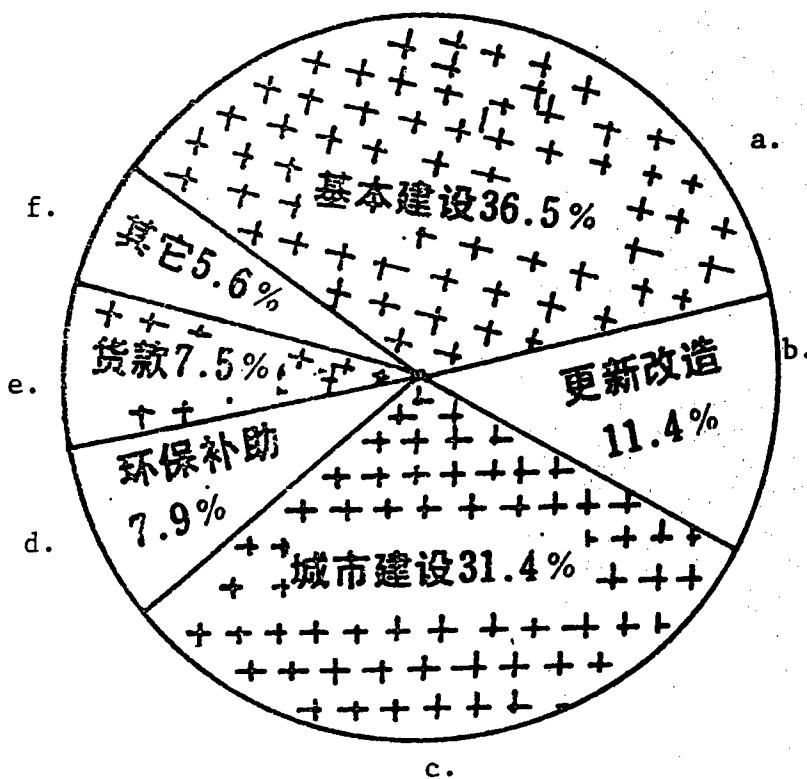


Figure 2. Environmental Protection Capital Sources, 1986-1988

Key: a. Capital construction 36.5 percent b. Renewal and upgrading 11.4 percent c. Urban construction 31.4 percent
d. Environmental protection subsidies 7.9 percent e. Loans 7.5 percent f. Other 5.6 percent

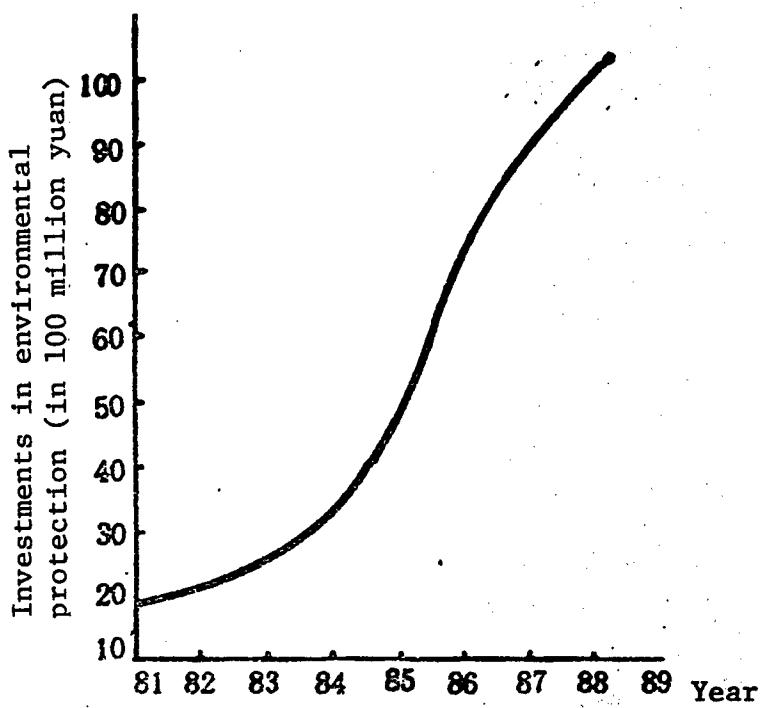


Figure 3. Changes in Investments in Environmental Protection, 1981-1989

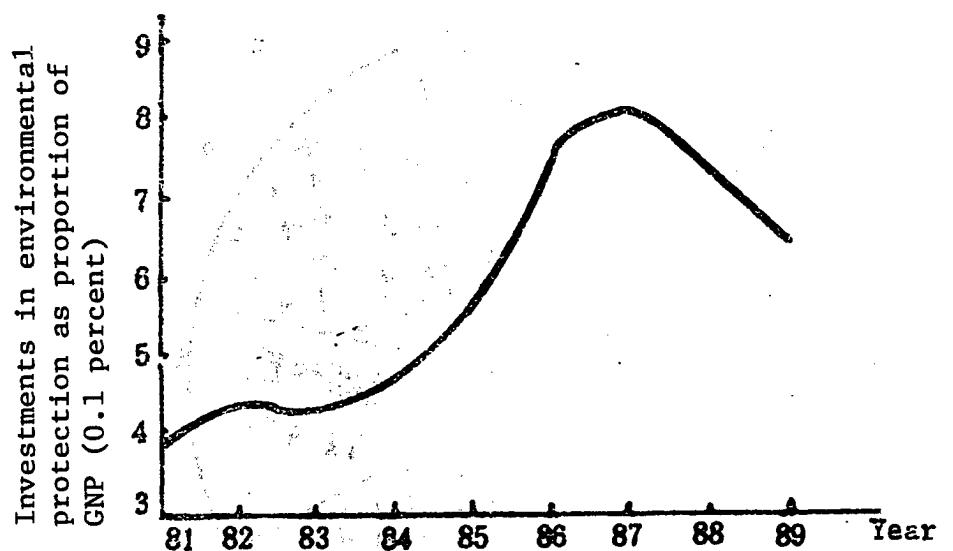


Figure 4. Changes in Ratio Between Investments in Environmental Protection and GNP

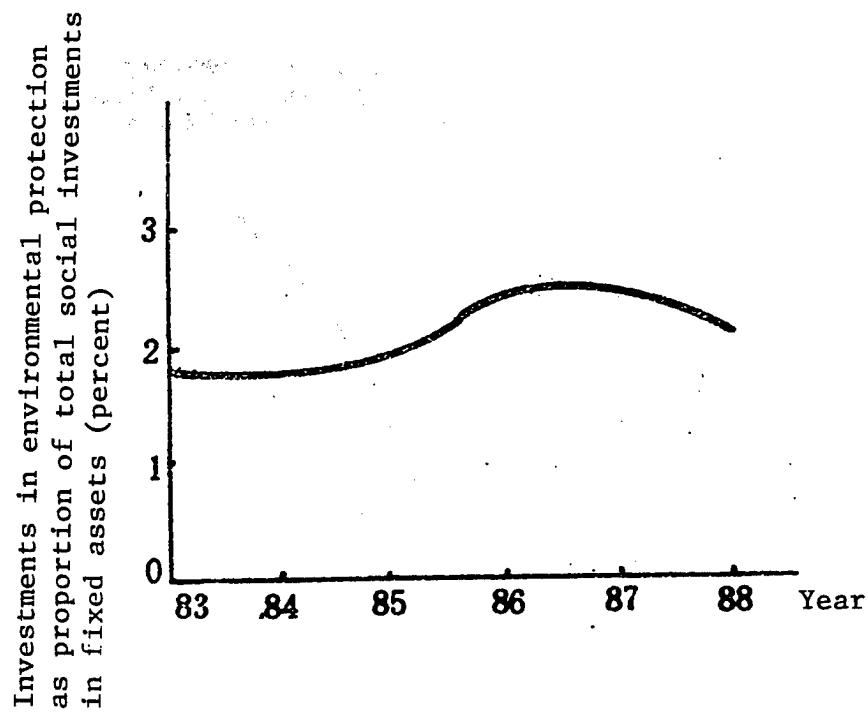


Figure 5. Changes in Investments in Environmental Protection as a Proportion of Total Social Investments in Fixed Assets

Table 1. Sources of Investments in Environmental Protection (units: billion yuan)

Year	Total	Capital construction capital	Renewal and upgrading capital	Urban construction fees	Retained profits from comprehensive utilization	Environmental protection subsidy capital	Loans	Other
1981	1.97	0.53	0.48	0.53	0.07	0.12	0.10	0.14
1982	2.29	0.44	0.47	0.68	0.05	0.25	0.17	0.23
1983	2.49	0.47	0.46	0.86	0.05	0.30	0.17	0.18
1984	3.31	0.72	0.52	1.20	0.08	0.44	0.19	0.17
1985	4.85	1.24	0.60	1.91	0.06	0.49	0.32	0.23
1986	7.44	2.47	0.83	2.62	0.09	0.61	0.46	0.32
1987	9.14	3.53	0.99	2.73	0.11	0.67	0.72	0.34
1988	10.06	3.71	1.21	3.01	0.12	0.66	0.83	0.46
1989	10.25	3.76	1.40	3.09	0.11	0.63	0.75	0.51

Table 2. Investments in Environmental Protection as a Proportion of All Investments (percent)

	Year					
	1983	1984	1985	1986	1987	1988
Proportion (percent)						
Capital construction	0.79	0.96	1.15	2.10	2.63	2.36
Renewal and upgrading	1.58	1.67	1.34	1.34	1.30	1.24
Urban construction	30.46	26.96	29.91	32.75	30.23	26.54

Note: The proportion stipulated by state is 7 percent.

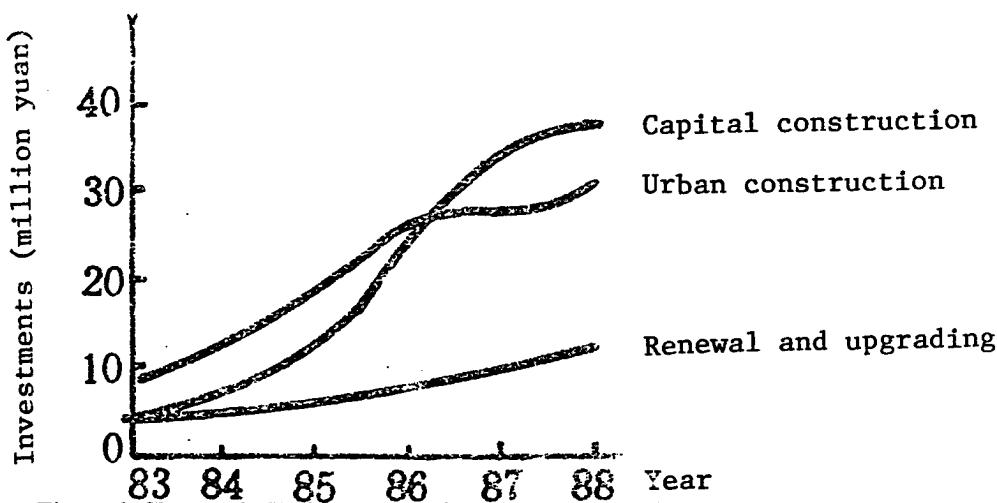


Figure 6. Changes in Various Types of Investments Used for Environmental Protection

Analysis of statistics on environmental protection investments over the years permits these conclusions to be drawn:

1. After all channels were opened up, total investments in environmental protection grew rather quickly and there has been a continued increase in the proportion they comprise of GNP and total social investments in fixed assets;
2. Increases in environmental protection investments are closely related to increases in social investments in fixed assets;

3. Environmental protection investments in capital construction projects have grown rather quickly, there has been stable growth in environmental protection investments in urban construction projects, and environmental protection investments in technical upgrading projects are low and unstable;

4. Investments in environmental protection as a proportion of investments in capital construction and in renewal and upgrading are too low and have not met requirements stipulated in policies;

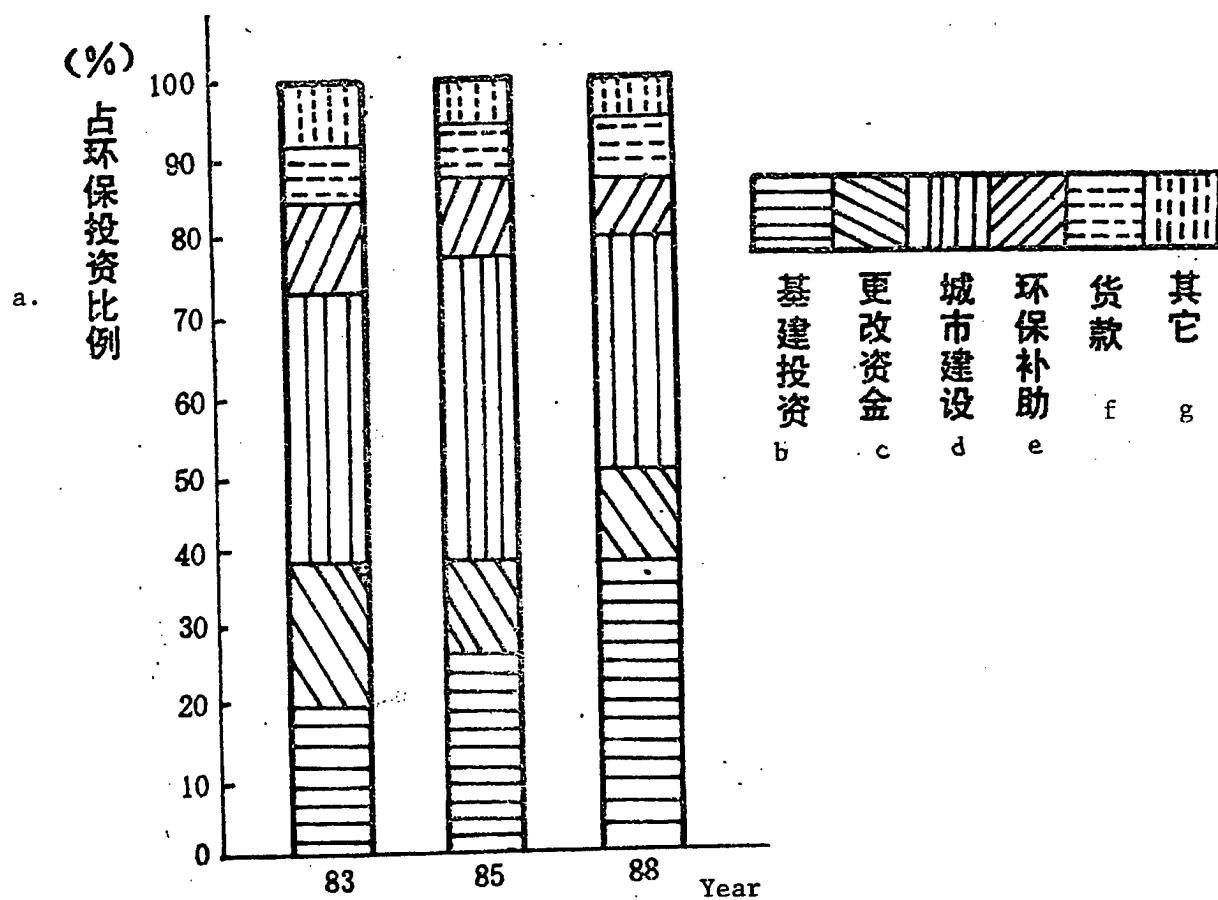


Figure 7. Structure of Environmental Protection Investment Sources

Key: a. Proportion of investments in environmental protection (percent) b. Capital construction c. Renewal and upgrading capital d. Urban construction e. Environmental protection subsidies f. Loans g. Other

5. Increased investment in environmental protection has had positive and important effects on China's environmental situation.

Government Gives 'Top Priority' to Improving Environment

HK2206025091 Beijing CHINA DAILY in English
22 Jun 91 p 1

[By staff reporter Zhu Baoxia]

[Text] The government has promised to give top priority to improving the environment by curbing industrial pollution and speeding up urban infrastructural projects.

The Ministry of Construction and the State Agency of Environmental Protection are working together on a national programme aimed at improving environmental conditions before the turn of the century.

The major tasks will be to stop deterioration of urban environments, protect the sources of drinking water, improve and maintain environmental quality around residential and tourist regions, and keep the environment in step with economic and social advancement.

The ministry said if these targets were fulfilled by the year 2000, dust density in the urban atmosphere should be markedly reduced, while more than 95 percent of drinking water sources would be up to the State standard.

By 1995, more than 70 percent of industrial waste water should be treated before being discharged into the environment. The treatment rates for industrial waste gas and solid refuse should be raised to 74 and 35 percent respectively.

Green space would be increased by 5 percent in cities and towns and the green area per capita would be increased by at least one square metre, according to the draft programme.

Domestic refuse will be cleared on time every day, with 15 to 20 percent of it subject to treatment to make safe any harmful substances.

Renovation of public toilets will be carried out in all cities and towns, with more well-equipped facilities in the tourist and central urban districts.

Arterial highways as well as more than 90 percent of the urban roads are to be paved with asphalt and infrastructural facilities including bridges, street lamps, drainage and flood-control projects should be kept intact.

The installation rates of tap water, cooking gas and central heating in each city and town must reach 92, 50 and 15 percent respectively.

Between 1986 and 1989, the State invested more than 11.4 billion yuan (\$2.1 billion) in urban environmental construction, more than double the figure for 1981-85, and marked improvements have been achieved through cooperation between governments and residents.

Capacity of tap water increased by more than 16 million tons in cities across the country. The areas with central heating grew by 48.2 million square metres.

The amount of public garden for each urban resident rose from 2.8 square metres to 3.9.

Some new refuse and waste water treatment plants have been built, which expanded waste water disposal capacity by 1.54 million tons per day.

Measures To Prevent International Pollutant Transfer

91WN0464B Beijing ZHONGGUO HUANJING BAO
[CHINA ENVIRONMENTAL NEWS] in Chinese
7 Mar 91 p 2

[Article by Wang Suli [3769 1121 3810]: "Protect China's Environmental Rights and Interests, Strictly Prevent Pollutant Transfers"]

[Text] For the past several years, following implementation of China's policy of opening up to the outside world and rapid growth of economic construction, there have occasionally been transfers of pollutants from plants and businesses in foreign countries and outside our borders (the Hong Kong, Macao, and Taiwan regions). Such pollutant transfers are mainly due to imports of production technology and equipment that does not satisfy environmental protection requirements and to imports of toxic and harmful waste materials and garbage. To prevent this type of pollutant transfer, the "Decisions" make two important stipulations.

1. Technology and equipment imported from foreign countries and from outside of our borders must not damage China's environmental rights and interests.

The goal behind importing advanced development and equipment from foreign countries and from outside our borders is to accelerate renewal and technical upgrading of equipment in China's enterprises and promote economic development. Still, in actual practice, some foreign businesses have used our sense of urgency in accelerating development of our national economy and tried to transfer backward technology and equipment to China. Some enterprises in China have blindly accepted it for purely economic goals, with the result being the transfer of pollutants. To prevent pollutant transfers from imported technology and equipment, the "Decisions" clearly stipulate that "units which import technology and equipment

from foreign countries and from outside China's borders must respect China's environmental protection laws, regulations, and policies. They must not damage China's environmental rights and interests or relax environmental protection stipulations." This stipulation contains two levels of meaning. First, from the perspective of abiding by the law, all units which import technology and equipment, regardless of whether they are state-run enterprises, collective enterprises, private enterprises, or Chinese-foreign joint ventures, enterprises owned independently by foreign capitalists, and regardless of whether they are located in economic development zones along the coast or in the interior, all without exception must respect environmental protection stipulations in China's environmental protection laws, regulations, and policies regarding imported technology and equipment. The main content of these stipulations includes: Importation of technology and equipment that do not meet the requirements in China's environmental protection stipulations is prohibited. Imported technology and equipment must be advanced and appropriate and meet the requirements of no or little pollution. That which does cause pollution and for which there are no corresponding facilities in China to deal with it must at the same time import the corresponding sets of environmental protection facilities. Technology and equipment which serves as the investment of foreign joint venture partners must be advanced and appropriate for China's needs. If there is willful deception in importing backward technology and equipment which results in losses, these losses must be compensated. Second, from the perspective of enforcing the law, the management departments involved in importing the technology and equipment must enforce the law in strict accordance with the above stipulations. They must not establish "local policies" outside of laws and regulations or relax in implementing environmental protection stipulations because of special qualities of the importing units or because they are local in unique regions. Lowering of environmental protection requirements or relaxation of environmental protection stipulations to compete for investment by foreign businesses or import projects must be prohibited.

2. The transfer of toxic and harmful wastes and garbage on the list of dangerous materials into China for processing from foreign countries and from outside of China's borders is prohibited.

It is extremely difficult or even impossible to repair the damage to the environment and human health caused by toxic and harmful wastes. Elimination of the threat from this category of wastes often requires relatively high technology and consumes large amounts of capital. In Europe, it costs about \$ 1,000 to treat one ton of toxic or harmful wastes, but it costs just \$10 per ton if it is sent to countries in Africa for processing. As a result, developed nations are responding to the heavy cost by trying in a myriad of ways to transfer their toxic and harmful wastes and garbage to foreign countries for disposal. To protect human health, restrict the transfer of pollutants from the developed nations, and protect developing nations from the threat of pollutant transfers, the Plenipotentiary Congress on the "Basel Convention To Control the Transfer of Hazardous

"Waste Across Borders and Its Disposal" which met in Basel, Switzerland on 22 Mar 89 passed this "Convention". The Chinese government signed the "Convention" on 22 Mar 90. The "Convention" stipulates that all countries have the sovereign right to prohibit the entry of hazardous waste (which China customarily calls toxic and harmful waste) into its territory from other countries or disposal on its territory. China is a developing nation which lacks capital. Importing some hazardous waste to China for disposal may provide some economic benefits, but China's present ability to manage hazardous waste at present is extremely weak and the corresponding laws, regulations, and standards are extremely imperfect. Monitoring has not gotten under way and we lack effective processing and disposal facilities and accident emergency facilities. People have a very limited understanding of the dangers of hazardous waste. With this sort of management situation, allowing the importation of hazardous waste for disposal could only result in endless future problems and endanger future generations. Moreover, importing this type of waste material could cause major damage to China's political reputation and international image. Thus, to protect China's environmental rights and interests, the "Decisions" clearly stipulate that the transfer of toxic and harmful waste and garbage which is listed as having hazardous properties into China from foreign countries or from outside China's borders is prohibited. This expresses China's resolute attitude toward preventing pollutant transfers and stipulates the scope of prohibitions on the importation and disposal of hazardous waste.

Plans To Prevent Import of Toxic Waste Laid Out
91WN0464C Beijing RENMIN RIBAO OVERSEAS
EDITION in Chinese 13 Apr 91 p 5

[Article by reporter Zhuo Peirong [0587 1014 2837] and trainee Yuan Jun [5913 0193]: "Relevant Departments in China Make Concrete Deployments To Control Entry of Toxic Waste and Garbage"]

[Text] The State Environmental Protection Bureau and Inspectorate General of Customs recently made deployments to strictly control the transfer of toxic waste and garbage into China from outside our borders.

There are strict import controls for a total of 32 categories of toxic waste and garbage. They include waste containing cyanide, waste containing PCBs, waste pesticides, herbicides, germicides, waste containing beryllium, arsenic, selenium, cadmium, and other elements and their compounds, waste containing copper and zinc compounds, asbestos waste, waste tarry residues generated during refining, distillation, and pyrolysis processing, waste pharmaceuticals, waste drugs, and incidental wastes, household garbage, residues from the burning of household garbage, and industrial garbage like trash and mud from building construction.

There have apparently been rapid increases in international transfers of toxic waste and garbage across national borders in the past several years and many developed nations are transferring large amounts of industrial and household waste to the developing nations.

Some localities and units in China have also allowed the transfer of toxic wastes and garbage into China from outside our borders solely for short-term and local interests. To control this sort of transfer, the international "Basel Convention" was passed to control the movement of waste across borders and its disposal, and China has already signed this convention.

The State Environmental Protection Bureau and Inspectorate General of Customs recently made special stipulations regarding this question which prohibit the transfer of 32 categories of waste and garbage into China and their disposal. Those things for which there are special needs for use as raw materials and energy resources or which can be renewed for utilization must undergo examination and approval by environmental protection departments. Importers and users of wastes must make environmental risk assessments and environmental protection departments will organize debate and inspection. When imported wastes arrive at ports, examination reports must be submitted to environmental protection departments. Customs will examine and accept the results of the inspection reports. In cases of transfers into China that violate stipulations, environmental protection departments are responsible for ordering that the materials be sent back across the border.

103 Polluting Enterprises Moved Out of Beijing in
Last 5 Years
OW2306140691 Beijing XINHUA in English
1346 GMT 23 Jun 91

[Text] Beijing, June 23 (XINHUA)—The Beijing municipal government announced today that 103 enterprises which caused pollution were moved out of the city proper in the past five years.

Zhou Yongli, a municipal official in charge of environmental protection, said that the enterprises which have been moved out caused shortages of energy and water, problems in communications and environmental contamination in the past.

Some enterprises' pollution has even caused conflicts between the enterprises and local residents. He said that both the citizens and the enterprises are satisfied with the moving. He said that the enterprises occupied a total area of 99.2 hectares in the city proper.

More than 50 percent of the city's industrial enterprises are concentrated in a downtown area of 750 sq m [as received], accounting for only five percent of the municipality's total area.

REGIONAL AFFAIRS

Greenpeace Warns of Nuclear Pollution in South Pacific

AU2406131691 Paris AFP in English 1235 GMT
24 Jun 91

[Text] Brussels, June 24 (AFP) — The ecological organisation Greenpeace said here Monday [24 June] that radioactive elements were leaking from French underground nuclear testing sites in the South Pacific, and called for an independent probe.

It called on the European Commission, executive arm of the European Community (EC), to back its demand for an independent study of the effects of nuclear testing on two coral atolls in French Polynesia.

Greenpeace official Jean-Luc Thierry told a press conference: "The tests and the concealment must stop."

"The environmental consequences of damage to the coral atolls (of Mururoa and Fangatau) and marine environment from France's nuclear tests are far too serious to be hidden behind military secrecy."

Greenpeace said plankton samples it collected in December in the ocean near the testing area contained cesium-134, which results from nuclear testing. It said this indicated radioactive contamination from the testing site.

But the organisation said it had been unable to obtain final proof because the French military had barred access to its military exclusion zone around Mururoa, and had arrested five Greenpeace researchers venturing inside it.

"Greenpeace is concerned that radioactivity may already be leaking from the French underground nuclear tests at Mururoa and Fangatau, despite official French assurances that no leakage will occur for hundreds of years," it said.

It said the European Atomic Energy Community (Euratom), the EC's nuclear energy arm, had the legal right to demand French cooperation in an independent investigation, and should enforce this right.

Greenpeace also released a copy of a letter to French Prime Minister Edith Cresson, signed by 15 scientists, calling for an independent probe of what it called a "potentially grave environmental threat".

The scientists, from France, Britain, Germany, the United States, Japan, New Zealand and Fiji, rejected a recent French offer of an investigation by scientists at nuclear institutions because they said it lacked independence.

JAPAN

Tokyo Council Seeks Industry Involvement in Environmental Care

OW2606101791 Tokyo KYODO in English 0942 GMT
26 Jun 91

[Text] Tokyo, June 26 KYODO—A Tokyo-based environmental council backed by local government and industry

issued a proposal Wednesday encouraging greater industry participation in pollution control and environmental preservation.

The 10-point plan, released by the Tokyo Metropolitan Council for the Promotion of World Environmental Preservation, urges corporations to have representatives responsible for environmental protection and seeks the introduction of internal monitoring systems.

The plan also allows for advance assessment of the environmental effects of production, distribution, use, and disposal of products, and maintenance of overseas environmental standards when goods are exported.

The council is headed by Tokyo Gov. Shunichi Suzuki and draws its membership from the Environment Agency, the Tokyo Metropolitan Government, and industry organizations. It is the first time the three sectors have worked together on environmental issues.

The council plans to incorporate the proposals in an action plan it wants to have ready at the end of this year, in time for presentation next February at a meeting of corporate council members.

Of 636 companies surveyed by the metropolitan government in March, about a quarter said they have begun to develop recycled products or are using recycled paper.

Hitachi To Eliminate CFC Use in Refrigerating Machines

OW2806115791 Tokyo KYODO in English 0929 GMT
28 Jun 91

[Text] Tokyo, June 28 KYODO—Hitachi Ltd. said Friday it will start selling on July 1 a new type of centrifugal refrigerating machine intended to eliminate the use of ozone-destroying chlorofluorocarbons (CFCs).

The company said the new equipment can use hydrochlorofluorocarbons (HCFCs)—which do not destroy the earth's ozone layer as CFCs do—as a substitute refrigerant for CFCs. It can also use CFCs until the substitute material becomes commercially available in a few years.

The centrifugal refrigerating machine is used in air-conditioners in large buildings and factories.

Hitachi is selling 11 models of the machine for use in buildings with a floor space of 3,300 to 26,000 square meters. They are priced at 30-80 million yen each.

The company expects to sell 100 of the machines in a year.

Officials said the new equipment is intended to meet the Montreal Protocol which calls for global elimination of CFCs by the year 2000.

Hitachi will thus join Mitsubishi Heavy Industries Ltd. and Ebara Corp. in marketing HCFC-based centrifugal refrigerating machines.

CFCs—odorless, color gases—are also widely used as cleaning agents in the manufacture of semiconductors.

MALAYSIA

Commentary Lauds Forestry Management Policy
*BK2106095791 Kuala Lumpur Voice of Malaysia
 in English 0800 GMT 21 Jun 91*

[Station Commentary]

[Text] Forest preservation. Environment protection. Greening the earth. These are terms we have come to be familiar with. Malaysia, counted in the list of fast developing countries, subscribes positively to all measures taken to save this planet from destruction through pollution of the environment.

Where its forests are concerned, Malaysia gives its due attention to planning and implementing policies that ensure proper forest management. It is in this regard that the minister of primary industries, Dr. Lim Kheng Yeik, brought up the question of excessive logging in some areas in the country. Without naming them, he pointed out that four states had exceeded their respected quotas in the logging of timber in forest reserve areas. They have been asked to ensure that the practice is stopped. The warning came about as a result of a report from the National Forestry Council, which is empowered to oversee logging in the country.

Malaysia's quest for the preservation of forest will continue unabated. From this year, a day is being set aside, which will be an annual tree planting day which will be the country's contribution to the greening effect. Under the campaign the number of trees in the country is expected to increase by 17 million a year. Apart from that, brochures have been made available in hotels which are aimed at creating an awareness of the beauty and importance of our rain forest—Malaysia's heritage and pride, as they are believed to be the oldest in the world.

Everyone in Malaysia recognizes the need to preserve these natural forests which visitors to the country will admire and marvel at during their sojourn in the country. Not everyone is aware of the fact that Malaysia's forest resources are its best export earner next to petroleum. Their exploitation will naturally mean a lot to the country's coffers. But Malaysia has shown its willingness to accomodate the demands for proper forest management systems.

According to reports of [a] special investigating team, Malaysia's forestry policies are among the best in the world. And that is why Malaysians are baffled when some so-called environmental group hurled [syntax as received] wild accusations at Malaysia and other tropical countries for indiscriminate felling of trees. Sometimes, we are prompted to ask the developed and industrial countries some pertinent questions: What were their policies when they were in their stages of development? Did they not clear large areas of their forests to accomodate their growing populations and their expanding industries? Or are the current charges aimed at protecting their own timber industries against the competition from the tropical

countries whose timber products have proven their merit and quality in the world market? The answers are obvious.

On Malaysia's part, protection of the environment will always remain a high priority.

PHILIPPINES

Environmental Agency Receives \$80,000 Grant
*HK0107120091 Manila BUSINESS WORLD
 in English 1 Jul 91 p 2*

[By Hernani P. de Leon]

[Text] The Department of Environment and Natural Resources (DENR) received a sum of \$80,000 from two international institutions to fund technical studies for the United Nations Conference on Environment and Development (UNCED).

The conference, to be held in 1992 in Brazil, is concerned with initiatives on the integration of sustainable development strategies in UN-member governments' immediate and long-term development plans.

Delfin Ganapin, Jr., DENR assistant secretary for environment and research told BUSINESS WORLD the donations came in two packages.

One involves a \$30,000 assistance extended last month by the United Nations Development Program. The other, a \$50,000 grant from the Canadian International Development Agency, was received last Tuesday.

Mr. Ganapin said the two grants will provide a big boost to DENR's efforts of documenting success stories in the implementation of environmental programs and projects.

World Heritage

In another development, three national parks have been submitted by the local staff of the Man and Biosphere program for inclusion in the list of "World Heritage Sites" under the United Nations Educational, Scientific and Cultural Organization.

The three were identified by DENR sources as Tubbataha Reef National Marine Park and St. Paul's Subterranean National Park in the province of Palawan and Iglit-Baco National Park on the island of Mindoro.

Two years ago, Shemberg Marketing Corp. established a seaweed processing facility in Tubbataha Reef. Shemberg was, however, evicted from the area due to a strong lobby from environmentalists and Palawan residents.

St. Paul's Subterranean Park, which is located in the northern portion of Palawan Island, is also threatened by a nearby logging concession operated by Nationwide Princess Timber Corp.

The Iglit-Baco on Mindoro Island, meanwhile, has been identified as the only remaining natural habitat of the tamaraw. Encroachment of poachers and upland settlers is, however, threatening the ecosystem of the area. Mr. Ganapin said recognition of the three parks as World

Heritage Sites by UNESCO could open up new funding opportunities for the government specifically in the protection of these parks.

THAILAND

Ministers Review Unleaded, Gasohol Energy Options

Phaichit Comments on Expected Standards

91WN0432A Bangkok DAO SIAM in Thai 22 Mar 91 p 2

[Excerpt] In his capacity as chairman of the Petroleum Policy Subcommittee, following a subcommittee meeting at the Government House on 21 March, Mr. Phaichit Uathawikun, the minister attached to the Office of the Prime Minister, stated that the subcommittee discussed changing the structure of our tax system in order to promote the use of clean fuels. This includes promoting the use of unleaded gasoline by reducing the import duty on this type of fuel so that this fuel costs less than regular gasoline. That will help induce people to use this type of fuel more.

Mr. Phaichit said that the problem with unleaded gasoline is that import costs are high. Unless action is taken, the retail price will be high. This is why the import duty must be reduced. Besides encouraging people to use this type of fuel more, this will also help reduce the harmful environmental effects in accord with the government's policy. At today's meeting, the subcommittee agreed to this in principle. As for the next step, the subcommittee has ordered the units responsible to conduct detailed studies on what needs to be done. This will be considered in April. Once that has been done, it should be possible to implement things around the middle of this year.

Mr. Phaichit said that besides this, those at the meeting also considered exerting pressure to have people start using unleaded gasoline sooner in order to solve the pollution problem caused by the incomplete burning of fuel. It will be difficult to solve the traffic problem and so steps must be taken to control the exhaust fumes, which contain toxic substances. One way of doing this is to use unleaded fuel. Today, the gasoline sold on the market contains additives of 0.4 percent, which is a very high percentage. Thus, steps must be taken to solve this problem. This must be done by reducing the amount of lead added to the fuel to only 0.15 percent or by using unleaded fuel.

"A study conducted by the Vehicle Industrialists Group found that 87 percent of the vehicles used in Thailand that are more than 10 years old can use unleaded fuel. Besides this, almost 90 percent of the vehicles sold in Thailand today can use unleaded fuel. As for the new vehicles that must be equipped with smog devices by September 1993, by which time Thailand's oil refineries will be able to produce unleaded fuel, I think that this must be done slowly, because the vehicles equipped with these devices can use unleaded fuel only. Our domestic refineries will have to be ready. The use of unleaded fuel will increase in May or the middle of this year. Initially, unleaded fuel will be imported from abroad, but it will be expensive. That is

why the tax system must be used to help keep the cost of this type of fuel lower than that of regular gasoline. Initially, there may be problems in finding service stations that sell this type of fuel. But within six months, there will be more stations that sell this fuel. This will pave the way for the new vehicles equipped with smog devices in 1993." [passage omitted]

Imports Planned

91WN0432B Bangkok BAN MUANG in Thai
22 Mar 91 pp 1, 19-20

[Excerpts] [passage omitted] Following a meeting of the Petroleum Policy Subcommittee held at the Government House on 21 March, Mr. Phaichit Uathawikun, the minister attached to the Office of the Prime Minister and the chairman of this subcommittee, said that the subcommittee discussed revising the tax system in order to promote the use of unleaded fuel. This is because the fuel now used contains up to 0.4 grams of lead per liter and this additive puts out toxic pollutants.

Unleaded fuel is expensive to produce, and it sells for a high price. Thus, the tax rates must be adjusted in line with the government's intention of reducing pollution. During the meeting, everyone agreed with this in principle. Thus, the units concerned have been ordered to study this in detail. This matter will be discussed again at the beginning of April. If there are no problems, it should be possible to implement things around the middle of 1991.

The minister attached to the Office of the Prime Minister said that the use of unleaded fuel will be implemented as soon as possible. It will be difficult to solve the traffic problem and so something must be done about the problem of vehicles emitting toxic fumes, which endangers everyone's health. What we must do is use clean fuels. This will reduce the amount of toxic pollutants in the air and reduce the danger to people's health. The gasoline used today contains about 0.4 grams of lead per liter, which is a very large amount. There are two ways to handle this. One is to reduce the amount of lead to only 0.15 grams per liter. The other is to completely eliminate the use of lead in gasoline.

Mr. Phaichit said that representatives of the Vehicle Industrialists Group were invited to come discuss this issue. It was learned that during the past 10 years, 87 percent of the vehicles can use unleaded fuel. It probably will not be until 1993 that our oil refinery is capable of producing unleaded fuel. That is a long time away. Thus, it has been stipulated that new vehicles must be equipped with smog devices starting in September 1993. The problem is that these devices require the use of unleaded fuel. Because we are still unprepared in many respects, we will have to import unleaded fuel. We want to promote the use of this type of fuel this May, but we will not be ready to produce this domestically. If we import this fuel, the price of this fuel will be higher than that of the gasoline now used. That is why we must adjust the tax system and reduce the retail price of this fuel so that it costs slightly less than regular gasoline. That will encourage people to use this type of fuel. Initially, there will probably be a few

problems regarding service stations. Special service stations must be built for this type of gasoline. But things should be fine in six months.

As for the talks with refinery officials, originally it was stipulated that things were to get under way on 1 September 1993, but this was later moved up to 1 January 1993. All sides have cooperated well. If there are no technical problems, it is thought that things will get under way around the middle of this year. By 1993, this problem should be solved.

As for BMTA [Bangkok Mass Transit Authority] buses and motorcycles, Mr. Phaichit said that they are supporting having buses use CMG fuel (compressed natural gas). As for motorcycles, there is a problem, because they use lubricating oil, which is a different matter entirely. There is a committee that is studying this, and the present administration is very interested in this. Even if this cannot be done in time, this will at least pave the way.

As for imported unleaded fuel, initially, people may criticize this, because it may be difficult to find service stations that sell this fuel. But within six months, there should be service stations selling this fuel throughout Bangkok. Anyone can import this fuel, because this is a free country. And once the tax structure has been revised, importers will not be at a disadvantage. If this type of fuel becomes popular and more people begin using it, oil importers will rush to import this type of fuel because they will want to maintain their share of the market. In the future, there will be both unleaded fuel and regular gasoline. No one will be forced to use this type of fuel, but the new cars will have to be equipped with smog devices. [passage omitted]

Deputy Minister Views Gasohol Use

91WN0432C Bangkok SIAM RAT in Thai 2 Apr 91 p 6

[Excerpt] [passage omitted] Mr. Wira Susangkonkan, the deputy minister of industry, said that he will push for the

production of gasohol. This program has been dangling since the previous administration. This is part of the plan to help solve the problem of oil prices, which were then rising.

Mr. Wira said that the tax on pure alcohol that is used in conjunction with gasoline to produce gasohol must be reduced or done away with completely. Today, the government's tax on alcohol is about seven baht per liter. This should be reduced to about one baht per liter or done away with completely. This will enable this project to actually get under way. And odor and color can be added to the alcohol so that people cannot use this alcohol to produce drinks.

Mr. Wira said that if this project does get under way, everyone will benefit. That includes farmers, who will be able to sell agricultural produce such as cassava and sugar cane that are used in producing alcohol. The plants will be able to purchase the crops at a price favorable to the farmers without having to consider the depressed prices on world markets. Besides this, using 99.5 percent pure alcohol to produce gasohol will help reduce the amount of lead in gasoline. It will not be necessary to use lead to increase the octane value. This will be much cheaper as compared with the NTBE [expansion unknown] additive, and it will not be necessary to import this from abroad.

The Ministry of Industry already has complete data on the gasohol program. The ministry is talking with the Ministry of Finance about reducing or eliminating the tax on alcohol. Once that has been done, this project can get under way. Some people are concerned that if the price of crude oil drops to below \$27 a barrel, it will be difficult to implement this project. But he said that that is not true. This project will still be worth investing in, said Mr. Wira in conclusion.

REGIONAL AFFAIRS

Official Reports EC Support for Hungarian Position on Gabcikovo

AU2106134291 Budapest MTI in English 1347 GMT
18 Jun 91

[Text] Budapest, 18 Jun (MTI)—The EC countries have elaborated a global approach to environmental protection. This is why the member states are committed to paying keen attention to the ecological problems of the east central European countries, Pedro Bofill, deputy president of the European Parliament's Committee for Environmental Protection, told some members of the Hungarian Parliamentary Committee of Environmental Protection in Budapest on Tuesday.

The deputy president gave briefs on the work of the EP Committee for Environmental Protection.

An MP said Hungary would be eager to receive more support from the European Parliament in its talks with the Czech and Slovakian Federal Republic on the Gabcikovo-Nagymaros hydroelectric project. In his answer, Pedro Bofill on behalf of the EP welcomed the Hungarian Parliament's decision to cancel the project. The decision, he said, reflected a high degree of awareness for ecological considerations. The documents available to the EC proved that the plant, if completed, would have caused grave damage to the environment, Bofill said. Nevertheless, the EC has no right to intervene in the sovereign decisions of two states, he added.

The only thing the EC can attempt to do is to persuade the Czechoslovakian side to adopt a more flexible position. In so doing, they wish to act as cautiously as possible. Furthermore, the EC will support the Hungarian position more efficiently. The draft resolution the committee is to put forward to the European Parliament will express greater moral support for the Hungarian position. Later on, the EC is to inform the governments concerned about its resolution.

Collins Denies EC Supports Hungarian Position on Gabcikovo

AU2106134491 Bratislava NARODNA OBRODA
in Slovak 20 Jun 91 p 1

[CTK report: "Another Lie Unveiled"]

[Text] Brussels—CSFR Deputy Foreign Minister Zdenko Pirek, who is holding discussions in Brussels on Czechoslovakia's association agreement with the European Communities, met—upon his own request—with Kenneth Collins, European Parliament Committee for Environmental Protection chairman, yesterday. He demanded an explanation of the statements on the Gabcikovo-Nagymaros electric power project made—according to the MTI press agency—by Pedro Bofill, "deputy chairman of the European Parliament Committee for Environmental Protection". He allegedly made a statement that the European Parliament highly appreciates the Hungarian Parliament's stance against the completion of the hydro project on the

Danube River. K. Collins drew attention to the fact that P. Bofill is neither deputy chairman nor even a member of the European Parliament Committee for Environmental Protection, but that he is the deputy chairman of the European Parliament Delegation for Contacts with the Hungarian Parliament. Collins stressed that the committee, which he chairs, has never dealt with problems connected with the Gabcikovo-Nagymaros hydro project.

BULGARIA

Kozloduy Nuclear Power Station in Dangerous State

LD2706204591 Berlin ADN in German 1903 GMT
27 Jun 91

[Text] Cologne (ADN)—According to Deutschlandfunk's information, there is the danger of a nuclear disaster at the Kozloduy Nuclear Power Station in Bulgaria. As the radio station reported this evening, the general state of the four Soviet reactor blocks, each with an output of 440 megawatts, of the same model as Greifswald, is shocking, in the opinion of international experts. Soviet specialists who were responsible for safety at the reactors were withdrawn months ago. Some of the local staff want to leave the plant. The oldest blocks, one and two, are still on line and blocks three and four are to be started up again shortly.

Deutschlandfunk reports that Bulgaria has made an unofficial request for help to the Vienna-based International Atomic Energy Agency and Western European countries with nuclear energy. It is questionable whether the reactors can still be shut down safely without extra specialists.

CZECHOSLOVAKIA

Soviet Military Damage to Environment Exceeds Original Estimates

AU2806120091 Prague CTK in English 1604 GMT
26 Jun 91

[Text] Turnov, east Bohemia, June 26 (CTK)—The latest research on the level of environmental damage caused by Soviet troops stationed in Czechoslovakia since 1968 indicates that the original estimate of 2,500 million korunas (\$83.3 million) was too low, Czech Deputy Environment Minister Vaclav Vucka announced here today.

Vucka, who also heads the Czech Republic's commission on this issue, made the announcement at a meeting of local officials from towns in east Bohemia where Soviet garrisons were located.

Just yesterday the final protocol on the withdrawal of the Soviet Army from Czechoslovakia was signed in Prague, bringing an end to negotiations that began in February 1990. While the last Soviet soldier departed on June 21, the issue of compensation for material, environmental and other damage inflicted during the Soviet Army's 23-year stationing in Czechoslovakia remains open.

The Soviet Union has accepted responsibility for 290 million korunas' (\$9.7 million) worth of damage to buildings throughout the country, according to an official from

the Czechoslovak Defense Ministry, but the Czechoslovak side insists the actual amount of damage is much higher.

In 1990 Czechoslovakia spent 104 million korunas (\$3.5 million) to restore buildings used by the Soviets to usable condition, and the Federal Assembly (parliament) approved for this year a sum of 200 million korunas (\$6.7 million) for the same purpose, including 110 million (\$3.7 million) for research and environmental cleanup.

The Soviet Union is leaving behind at its embassy a 25-member team of experts to negotiate financial settlements on environmental damage and property. A draft agreement on these issues has already been approved by the Czechoslovak Government, and is now awaiting approval by the Soviet side.

HUNGARY

Government Approves New Energy Policy

*LD1906154891 Budapest MTI in English 1130 GMT
19 Jun 91*

[Text] Budapest, June 19, 1991 (MTI-ECONNEWS)—The most important elements in Hungary's new energy policy, approved by the government this week, [are] a reduction in Hungary's dependence on imports, the diversification of imports, more efficient energy consumption—both through energy saving and the modernisation of production methods—the implementation of market principles and a reduction in state intervention.

The policy document splits the period up to the year 2000 into a transitional period and a subsequent period to consolidate market conditions.

Based on the present four-year economic programme, the economic recession is expected to continue this year but an upturn will see the GDP regain the 1989 level by 1993.

The document puts forward three scenarios, the most optimistic being that the restructuring of the economy will proceed quickly, with an annual 6-percent rate of growth in the GDP. Overall specific energy use will drop by 3.5 percent, while the average annual energy consumption will grow by 2.2 percent.

The middle variant forecasts a slower restructuring process, a 3-percent annual growth in the GDP, a 2.5-percent drop in overall specific energy use and an increase in energy consumption by not more than an average 0.5 percent per year.

The least rosy view, meanwhile, foresees annual growth of only 1.5 percent, as both the modernisation of outdated production facilities and the re-organization of state monopolies drag on. Overall specific energy use would increase by an average of only 0.5 percent a year. The government sees this last version as something which the Hungarian economy must avoid at all costs.

Preliminary figures suggest that the total energy consumption can be projected at between 1,250 and 1,400 petajoules, the equivalent of 30-33 million tonnes of oil.

With 65 percent of Hungary's current energy needs met through imports, prospects vary for increasing these supplies. Coal is available without restriction, natural gas can be imported only from the Soviet Union via the existing pipe network, and although the Soviet Union is now sending less crude oil to Hungary than before, the shortfall can be made up from other markets and transported through the Adria pipeline.

1,100 mw electricity is to arrive from the Soviet Union this year, a figure which is likely to be maintained over the next two to three years.

As concerns the coal industry, there are long-term plans to open new mines and to increase coal imports to replace output from loss-making pits which are to close. Household consumption is expected to fall from 5 million to 4 million tonnes, while total demand will rise to an annual 14-16 million tonnes by the end of the decade.

By 2000, oil production will have fallen from the 2 million tonnes to 1.5 million tonnes, while natural gas production is expected to fall from 5 million to 4 billion cubic metres. This will also have to be made up from imports.

Hungary used 11 billion cubic metres of natural gas last year, and will need 12.5-14 billion cubic metres in 2000, 8.5-10 billion cubic metres of which will be imported.

The current Hungarian electricity grid is capable of putting out only 15 percent more electricity than the country's current demand, while electricity imported from the Soviet Union has fallen recently.

The new energy policy therefore also covers the issue of the domestic power plant development programme, taking the age and technical state of conventional power plants in Hungary and the loss of Soviet imports into consideration.

The construction programme has two elements, with priority being given to the construction of the open-cycle power plant, suitable for peak operation, or to the combined-cycle, gas-fueled one, as such plants can be built at lower [cost] more cheaply and are both more efficient and less harmful to the environment than nuclear and coal-fueled equivalents. However, such plants will increase the country's dependence on hydrocarbon imports.

Arpad Bakay, deputy state secretary for the Ministry of Industry and Trade, told a press conference that the government has not completely rejected the idea of building nuclear or coal-fueled basic power stations, but short-term supply problems could be solved with gas-turbine power plants, which could be constructed within three years.

A decision on large-output basic power plants, which would take 8-10 years to build, is not so pressing, the deputy state secretary said.

Soviet Military's Damage to Environment Reported
LD2006225191 Budapest MTI in English 1347 GMT
20 Jun 91

[Text] Budapest, June 20 (MTI)—In the Thursday session of the parliament's Committee on Environmental Protection, Lieutenant General Antall Annus and government commissioner Gabor Szabo reported on the damage the Soviet troops had done to the Hungarian environment.

They said that the ecological and environmental damage came to about 66,500 forints, while the losses stemming from the Soviet troops' failure to maintain the Hungarian-built facilities amounted to 14,000 million forints. The value of "pending affairs" stands at 5,200 million forints, and that of the value of buildings to be demolished at 5,500 million forints. The damage done to monuments come to 5,300 million forints, and other damage 2,000 million forints. The total claim amounts to nearly 100,000 million forints. According to the Hungarian position, this claim forms the basis of negotiations.

Szabo informed the committee that a large amount of kerosene had been released into the soil and the subsoil waters near the military airports, for instance at Tokol. The latter pollution may endanger the drinking water resources of Budapest.

POLAND

Environmental Damage Caused by Soviet Forces Assessed

AU2406163991 Warsaw ZYCIE WARSZAWY in Polish
19 Jun 91 pp 1-2

[“E.O”-signed report: “Damage to the Environment: 53 Trillion Zlotys”]

[Text] The Ministry of Environmental Protection, Natural Resources, and Forestry has estimated the environmental losses caused by the stationing of units of the Soviet Army in Poland at over 53 trillion zlotys [Z].

The losses sustained by State Forests have been estimated at Z27.785 trillion (the calculations took account of non-payment for the use of sites, damage to trees, as well as the losses resulting from the inability to use sites for commercial forestry purposes).

The pollution caused to soil and subsoil waters by petrochemical products has been estimated at Z25 trillion. Nonpayment for the use of sites and penalties for polluting such sites have been put at Z327 billion.

The Soviet forces stationed in Poland occupy 35 bases in 15 voivodships and use a total of 70,000 hectares of land.

Last year the State Environmental Protection Inspectorate conducted inspections at nine bases.

The inspectors established that the Soviet forces use of environmental resources was completely illegal. None of the units possessed permits for drawing water and sewage disposal, and no binding decisions had been issued setting levels on the emission of waste gases or designating sites for the storage of waste materials. Besides, they did not submit applications for such decisions and were thus able to avoid paying fines for damaging the environment.

Payments and fines were first levied in 1989 (the sums are large, as, for example, the unit in Brzeg should have been paying Z150,000 per 24-hour period for discharging sewage since November), but so far it has not been possible to enforce payment. The Soviet side has declined to pay on the grounds that the 1956 law on the legal status of Soviet forces temporarily stationed in Poland contains no provisions on payment for the use of environmental resources or for damage to the environment.

Some of the worst damage caused by the presence of Soviet forces on the territory of our country is due to the pollution of water and soil with petrochemical substances. One of the worst incidents, which was on the scale of an ecological disaster, occurred in Stara Kopernai in 1988, where 10 hectares of land and underground water were polluted. The cost of the damage has not been estimated to date.

In Swinoujscie it was found that petrochemical substances had been dumped in a pit, and on three occasions (the most recent one being in last year) port waters were polluted.

Inspections conducted by the State Environmental Protection Inspectorate were to be continued and the results, along with those of previous inspections, were to provide a basis for assessing the damage caused to the environment by the presence of the forces. However, since 14 March, the Soviet side has not made it possible for environmental protection services to carry out further inspections, despite numerous negotiations and the fulfillment of all the other conditions set by the Northern Group of Forces command. That is why the figures given by the Ministry of Environmental Protection are estimates.

The legal issues raised by the question of compensation for environmental damage are the subject of negotiations with the Soviet side. It is to be settled by Article 17 of the “protocol between the government of Poland and the government of the Soviet Union on the settlement of legal, property, and financial issues connected with the withdrawal of Soviet forces temporarily stationed in Poland. However, the provision relating to compensation proposed by the Polish side has been rejected by the Soviet side thus far.

BRAZIL**Collor Requests Aid To Implement Environment Program**

PY2806001391 Brasilia Radio Nacional da Amazonia Network in Portuguese 1000 GMT 27 Jun 91

[Text] President Fernando Collor wants countries from the Group of Seven to provide resources that will be used to safeguard the tropical rain forest, as part of a foreign debt conversion project.

Collor made this request in a letter to the chiefs of state of the Group of Seven. In his letter, Collor reminds the chiefs of state of the richest countries in the world that the Brazilian Government has already drafted a pilot program which is being discussed in meetings with representatives from the European Community commissions and the World Bank.

This pilot program includes structural conservation projects, the protection of basic ecosystems, the handling of renewable natural resources, the improvement of degraded areas, environment education, and surveillance and control programs.

President Collor ends his letter by stating that he hopes the subject will be discussed during the upcoming meeting in London and that Brazil will be granted financial support to implement the environment conservation projects foreseen in this pilot program.

Moreover, President Fernando Collor praised the work carried out by Foreign Minister Francisco Rezek. The president attributed to the foreign minister the success of his recent trips abroad. This was reported by Presidential Spokesman Claudio Humberto, who mentioned the meetings that President Collor recently held with the Soviet and U.S. presidents.

Debt Conversion Plan To Include Ecology, Infrastructure

PY2806234791 Sao Paulo FOLHA DE SAO PAULO in Portuguese 25 Jun 91 p 7 Section 1

[Text] Brazil will convert \$100 million of its foreign debt into programs to preserve the environment. The transfer of those resources to environmental projects will be made through a patrimonial fund that will be created for that purpose. The resources will be transferred at a discount but the government has not yet determined the percentage.

Ministers began discussing the debt conversion plan yesterday during a cabinet meeting at Planalto Palace.

Projects involving infrastructure will also be considered in the debt conversion plan. The government has already made the decision although it has not yet been made public.

The government will accept debt conversion projects in any infrastructure project but will give absolute priority to projects to expand the electricity generating capacity and projects directed at cleaning up the finances of state enterprises that are to be privatized.

Preliminary government studies show that if the program works, \$15 billion could be converted at its most optimistic level over the three and a half years that remain in President Fernando Collor's mandate. A pessimistic assessment puts that estimate at \$3 billion.

Government technical studies indicate that conversion projects will favor the country if they do not generate inflation, at least in theory. The program operates as follows: Should the government want to conclude the Tucurui 2 aluminum project in Para State, for example, first, foreign investors interested in participating in the program would buy into the foreign debt at a discount on the secondary market and present their notes at the Central Bank. The Central Bank will then give the investors money that must be invested in the chosen project. The money is then rendered harmless to inflation (it cannot be adjusted for inflation) by the Central Bank administration which controls the increase in market liquidity.

Studies are not finished yet but the government has already received inquiries from foreign investors interested in both the Tucurui 2 project and also in cleaning up the finances of the public steel industry which has been defined as ready for privatization.

The government estimates that if negotiations with the IMF and private banks succeed, interest for these projects will increase and conversion projects will become so attractive that the optimistic projection of \$15 billion will become viable.

This amount represents more than 10 percent of the Brazilian foreign debt which is calculated at approximately \$114 billion.

Continued Devastation of Amazon Forest Reported

PY2406182091 Madrid EFE in English 1558 GMT 24 Jun 91

[Text] Rio de Janeiro, June 24 (EFE)—Brazil has destroyed more than 400,000 sq km of Amazon jungle, one of the world's most important natural resources, according to a government report published Monday [24 June].

Woodcutters have stripped of trees some 415,000 sq km of Amazon rain forest, a region roughly equivalent to the combined areas of Spain, Italy, Portugal and Austria, said the report published in the daily JORNAL DO BRASIL.

On Brazil's 3,000-km Atlantic coast, 92 percent of the natural growth has been stripped away by urban and industrial development.

In recent years, dozens of rivers have been contaminated by an estimated 1,500 tonnes of deadly mercury used by miners in their search for gold, the report said.

The miners use the toxic chemical to separate gold dust from the river mud, often dumping the mercury back in the river when they are finished.

Despite the dangerous state of the environment, the report said Brazil had conservation areas in only 3.7 percent of its territory.

Costa Rica, in comparison, has designated more than 20 percent of its land as environmental protection zones.

Brazil is due to host the 160-nation United Nations Conference on the Environment in Rio de Janeiro next year, where deforestation in the Amazon is expected to feature high on the agenda.

DOMINICAN REPUBLIC

Agricultural Chemicals Poisoning Constanza
91WN0511A Santo Domingo *EL SIGLO* in Spanish
23 May 91 p 7-B

[Article by Marino Zapete C.]

[Text] Constanza—People visiting this valley should not be surprised if, upon arriving at the town of Tireo after descending the mountain, their eyes and noses sting.

The locals here do not appear to notice, perhaps because their bodies have already adapted, but what is certain is that in this valley, the act of breathing is the beginning of a process of poisoning.

Reporters from this newspaper visited the town the day before yesterday to better acquaint themselves with the reason that President Joaquin Balaguer spoke of temporarily halting agricultural activity, to stem the dizzying process of collective poisoning.

As a local farmer said, in Constanza all types of agricultural poisons are sold, including prohibited ones, restricted ones, extremely toxic ones and anything else one might wish to add.

But that is not the worst of it. In this valley, there does not appear to be the slightest understanding of or concern for what is occurring, and people are interested only in farming.

The greatest evidence of this lies in the words of Vegetable Producers Association President and Agricultural Engineer Victor Manuel Baez, who during a meeting with agrochemical specialists said that the most important thing for farmers is farming.

"We cannot under any circumstances allow our production to decline because chemical products are prohibited, if we are given no alternatives to replace them," said Baez.

But the apparent indifference to the multiple problems caused by irresponsible use of pesticides not only affects farmers who legitimately wish to pursue their activities, but also the population in general.

It is not unusual to find in any field of this valley an extremely toxic poison applicator, with the undiluted product dissolving on the banks of a canal, and only a short distance away a woman washing clothes in that same canal and children and adults bathing in its waters.

Nor is it unusual to see very young children applying poison without the slightest protection, in the midst of a "fog" that barely allows one to distinguish their features.

In this valley it is common practice for farmers to apply high levels of poison to crops almost ready for harvesting, an unmistakable sign that consumers who use these products are being poisoned.

Walking around any farm in Constanza, people might find empty containers of extremely dangerous poison, despite the fact that according to the law, they should be burned or deeply buried in the soil.

It is clear that the environment has become much more fragile in Constanza in recent years, which does not seem to alarm the population, despite the high level of pollutants recorded in various studies that have previously been published.

The farmers appear not to believe in the dangers presented by the poisons, a fact that is obvious by the way they handle them.

By not following the recommended dosages, the periods for restraint, proper handling procedures and other requirements, diseases have become more resistant, making the situation worse.

When a product stops being effective because of the resistance of disease, many local farmers prepare what they themselves refer to as a "bomb"—a mixture of several products—and apply it with no technical knowledge.

It is common here to see people transporting agrochemicals in the same vehicle that carries people and food for the family, and it is also common to observe them repacking poisons without taking the slightest precautions, which is prohibited by law.

A poison might just as commonly be transported in its original container as in soft drink bottles, plastic thermoses, and any other type of container that might eventually be used for household purposes.

Something that should worry Constanzans, but apparently does not, is that farming is practiced up to the edge of the urban areas, which means that the effects of the products cross over to inhabited areas impeded.

The pollution situation in the Constanza Valley, although worse in recent years, is nothing new, but the authorities have done very little to correct it.

Some years ago the Secretaries of Agriculture and Public Health created an agromedicine unit to educate people and attend to those who had been affected by the chemicals, but this unit disappeared.

It is recalled that Dr. Ruben Marte, a member of that unit, blamed the United States for the suspension of Chinese vegetable exports to that country because residual pesticides had been found that were higher than the levels allowed by law, and the vegetables had to be discarded.

They did not like Dr. Marte in Constanza, because when he treated someone affected by pesticides he recommended that they discontinue applying the products if the landowners did not adequately protect them.

LATIN AMERICA

JPRS-TEN-91-014
9 July 1991

One fine day, Dr. Marte's wife woke early and when she tried to open the door to the street she could not do so, because they had thrown some 200 sacks of Chinese vegetables returned by American authorities onto the porch.

Later, the doctor was the target of various threats, and one of them almost came true when an unknown individual ran into him in a car while he was traveling on a motorcycle home from work.

Ruben Marte had to leave town, the agromedicine unit disappeared, and today one has to come to this valley to witness the crime being committed against nature and the people.

Agriculture Ministry Official Recommends Action Plan for Constanza

*91WN0511B Santo Domingo EL SIGLO in Spanish
23 May 91 p 7-B*

[Article by Marino Zapete C.]

[Text] Constanza—The pollution situation in the Constanza Valley is "serious and becoming worse," according to a report released today by Engineer Freddy Saladin, Director of the Department of Agricultural Research [DIA] of the Ministry of Agriculture.

The document, entitled "Report on the Constanza Valley Problem," indicates that 20 years after having detected the problems, "they have worsened to such an extent that to achieve a high level of productivity requires costs that are not always covered, which shows the progressive deterioration to which the area has been subjected."

According to Engineer Saladin, steps should be taken in this valley to conserve human life and the base that sustains it; preserve natural resources; and maintain vegetable exports to the United States.

"Unfortunately, in this valley, with no control over the chemicals and under currently prevailing conditions, some 45 percent of production would be lost to disease, plagues, etc.," Saladin noted.

The official cited eight recent studies of valley conditions, all of them agreeing that the situation is serious.

All the studies agree on the problems caused by the indiscriminate use of chemicals in general, particularly restricted insecticides, on the effects on the health of agricultural workers and valley residents, and on the valley's products for both domestic consumption and for export, he said.

Saladin presented a "Plan for Immediate Action" to the farmers and representatives of the agrochemical distribution houses, which will be implemented to minimize the risks of poisons and contamination of the environment and the valley's main agricultural products. The Plan for Immediate Action proposes assigning eight qualified officials to a technical team, which would be supervised and assisted by specialists in the areas of Entomology, Physical Pathology, Nematology and Herbology.

These officials would come from the Department of Agricultural Research, the Autonomous University of Santo Domingo, and the Integrated Disease Control Program in the north central region.

The proposal shows the need for that technical team to be provided with logistics support, economic resources and administrative facilities and transportation. It suggests "selecting the small valley of La Culata, with some 3,000 hectares, because of its isolation, as a pilot plan, to implement an integrated disease control program in coordination with the Dominican Agricultural Institute." In addition, to develop and implement a training program for using and handling insecticides and application equipment, regulating supplier advertisements, and producing and distributing educational materials at all levels.

It also proposes reactivating the Agriculture Secretariat's service to analyze pesticide residuals, to better identify the potential for producing untainted products among the valley's primary crops. The plan proposes updating the emergency assistance project, to correct serious problems in the use and application of pesticides in the valley.

Among specific measures to be implemented, it proposes utilizing selected insecticides to avoid affecting beneficial insects; the obligatory elimination of highly toxic or highly polluting pesticides, and the development of a technical guide for insecticides, fungicides and nematicides for use on the valley's primary crops.

It also proposes training farmers in the calibration and use of equipment for the application of pesticides and in health protection measures, as well as research on the benefits of crop rotation, evaluation of levels and frequencies of application of new biodegradable products, and determination of economic losses resulting from major disease and sicknesses. The Plan for Immediate Action also suggests restricting the use of irrigation water, cleaning up the canals, eliminating crop residuals, and creating an environmental protection commission for the valley, the goal of which would be to monitor compliance of the recommendations and regulations that have been established.

The document highlights the need to strictly apply and enforce Law 311 with regard to the manufacture, distribution, transport, dosage, maximum frequency of application, period of restraint, and tolerance of agrochemicals.

PARAGUAY

Nature Reserve, River Basin Protected Under New Agreement

*PY2806144291 Asuncion ABC COLOR in Spanish
28 Jun 91 p 12*

[Text] Hans Kurz, the resident representative of the United Nations Development Program [UNDP], at Government House yesterday said: "Today Paraguay is facing up to its duty of resolving the huge problem of the landless

peasants and, at the same time, protecting the last of the forests." The UNDP official asked: Will it be possible to resolve this dilemma?

He said this during the signing of an agreement to establish and conserve the Mbaracayu natural reserve and the Jejui River basin.

The agreement, which will facilitate the conservation of the aforementioned nature reserve, was formalized at the Americas Hall of the Lopez Palace. The chief of state and other high-ranking national authorities were present. The Moises Bertoni Foundation for the Conservation of Nature [Fundacion Moises Bertoni para la Conservacion de la Naturaleza] and the Nature Conservancy [two preceding words in English] organization have pledged to purchase the Mbaracayu Forest from the World Bank International Financial Corporation for \$2 million. This property is located in Canindeyu Department. It covers an area of 57,715 hectares and 2,785 square meters.

Engineer Raul Gauto, the executive director of the Moises Bertoni Foundation, spoke during the ceremony. He recalled that the agreement was signed following three years of negotiations with the World Bank and its subsidiary, the International Financial Corporation.

Kurz then addressed those present at the ceremony. He pointed out that environmental pollution reduces the chances that our children will grow up in conditions similar to ours. He said: "Paraguay is contributing to this problem by burning the forests for agricultural and livestock purposes, polluting the air, seeking to gain access to land that, to a large extent, is only suitable for growing trees. Thus, fauna and flora resources are lost in exchange for soil that rapidly deteriorates, pushing the farmer into a poverty circle from which he is unlikely to break away."

Kurz said: "We are all in the same boat. The earth houses us all like a sort of Noah's Ark, but the difference here is that harmony prevailed aboard the ark while today man has authoritatively imposed his order to the detriment of nature."

Foreign Minister Alexis Frutos Vaesken also spoke during the ceremony. He said: "Our government shares the common hope of humanity for development without destruction."

The Piccolo Financial Company and the International Financial Corporation, affiliated to the World Bank, had begun a joint project to produce lumber, but the enterprise did not survive. After negotiations with the Nature Conservancy organization, a private organization from the United States, the International Financial Corporation decided to sell the property to environment protection groups at a price considerably lower than that prevailing in the real estate market.

Foreign Minister Views Agreement on Nature Reserve PY2906033491 Asuncion HOY in Spanish 28 Jun 91 p 19

[Excerpts] President Andres Rodriguez yesterday attended the signing ceremony for an agreement creating a nature reserve in the Mbaracayu Forest and the Jejui River basin.

The project will be developed through cooperation with the Moises Bertoni Foundation by the United Nations and the Nature Conservancy.

Foreign Minister Alexis Frutos Vaesken spoke on the occasion. He said: "Executive branch ministers sign this agreement with special satisfaction. The agreement confirms the government's firm determination to preserve our future." The "Agreement Creating the Nature Reserve of Mbaracayu Forest and Jejui River Basin" was signed by the foreign minister; Industry and Commerce Minister Ubaldo Scavone, representing the agriculture minister; and Finance Minister Juan Jose Diaz Perez.

The ceremony took place at the "Americas Hall" of the Lopez Palace. Outstanding national civilian and military personalities and representatives of the diplomatic corps and international organizations attended the ceremony.

Frutos Vaesken recalled that President Andres Rodriguez presented the initiative to President George Bush and the World Bank president during his visit to Washington last year. Frutos said that the Mbaracayu forest "is nationally and internationally recognized for its special characteristics and rich wildlife." Frutos added that "another example of the government's willingness to preserve the environment was the creation of an Environment Under Secretariat within the sphere of the Agriculture Ministry."

Frutos Vaesken said: "Our government shares the common human goal of development without destruction and thanks and congratulates the United Nations Development Program, the Nature Conservancy, and the Moises Bertoni Foundation for making this agreement possible." The foreign minister added: "Thank you in the name of our government and the Paraguay of tomorrow. We are committed to continuing to work together for a greener, brighter future." [passage omitted]

Engineer Raul Gauto, executive director of the Moises Bertoni Foundation, also spoke during the ceremony. Referring to the agreement, Gauto said: "The cooperation agreement was unique in the country's history because it strongly emphasizes the defense of nature as an important element in the country's social, economic, and cultural development."

PERU

Severe Contamination of Rimac River Reported PY2406142291 Madrid EFE in Spanish 2149 GMT 23 Jun 91

[Excerpt] Lima, 23 Jun (EFE)—It was reported here today that the contamination of the Rimac River, which supplies water to Lima, can not be controlled either by chemicals or by boiling the water. It consequently represents a risk to the people.

Edgardo Quintanilla, dean of the Lima Departmental Council of the Peruvian Engineering School, has told the press that the polluted water can cause kidney ailments,

sterility, or cancer in the long term. He added that if the water contains a considerable amount of lead it can cause mental retardation.

Quintanilla said that the Rimac is considered one of the world's most contaminated rivers and that the Senate Ecology and Environment Commission has documented 140 places where contamination is dumped into the river.

Local experts have said that, from its source in the Peruvian mountains, the Rimac is contaminated by 26 mining installations; by agricultural waste including insecticides,

fertilizers, and pesticides; by 43 industrial installations; and at 150 settlements where residents living on its shores dump their domestic waste.

Among the elements thrown into the waters of the so-called "talkative river" are arsenic, chromium, cyanide, lead, and selenium, in quantities that are at times twice the safe limits established by the WHO. The Rimac supplies 60 percent of the drinking water to the 7 million people who live in Lima. This represents one third of the country's population (of 22 million people). [passage omitted]

REGIONAL AFFAIRS

Swedish 'Experts' on Allied Damage to Environment in Gulf War

*LD1706172791 Stockholm Radio Sweden in English
1130 GMT 17 Jun 91*

[Text] A report by two Swedish experts says the allied forces in the Gulf war may have caused more environmental damage than the Iraqis.

The two spent three weeks in Kuwait compiling a report for the United Nations, and they say halon gas used by the allies to reduce the risk of fire while refuelling aircraft poses a greater risk to the ozone layer than the better-known CFC [chlorofluorocarbon] gases. They also say its likely the Tigris and Euphrates Rivers were poisoned when the allies bombed chemical weapons factories in Iraq.

Swedish researchers say that 250 miles of Kuwait's coast is polluted by oil released into the Persian Gulf by the Iraqis, and they compare the effects of 500 burning oil wells which the Iraqis set on fire with Dante's Inferno.

UAE Health Minister on Air, Marine Pollution in Gulf

*JN1806164991 Manama WAKH in Arabic 0730 GMT
18 Jun 91*

[Text] Al-Shariqah, 18 Jun (WAKH)—Ahmad Bin-Sa'id al-Badi, health minister and chairman of the Higher Environment Committee in the United Arab Emirates [UAE], has said that the UAE's territorial waters are clean and that the country's environmental agencies have not registered any major marine pollution since the beginning of this year.

In statements published in the newspaper AL-KHALIJ today, he added that periodic surveys conducted on the UAE coast by the Technical Secretariat of the Higher Environment Committee have not registered any abnormal increase in the asphalt globule rate along the UAE coast over the past five months.

Al-Badi went on to say that the increase in the number of asphalt globules in some coastal areas in the Emirate of Dubai, which the municipality is attempting to remove, as mentioned in some reports, could be attributed to refuse let out by ships navigating in international waters. He said that such cases are usually registered in other coastal areas from time to time. He said it was difficult to say whether the asphalt globules were the product of the oil pollution of Gulf waters early this year caused by pumping large quantities of oil into those waters.

Al-Badi added that information reaching the UAE from the authorities in the Gulf Cooperation Council [GCC] states on oil pollution in the northern Gulf during the Gulf war showed that the oil slicks turned into heavy asphalt compounds as a result of the physical, chemical, and weather conditions that affected the slicks and that most of the oil slicks, because of these conditions, settled off the eastern coast of Saudi Arabia, while efforts to fight them

continue. None of the remnants of these oil slicks has been seen off the UAE's coast or within its territorial waters, he added.

The UAE health minister said that the results of the continuous weather monitoring tests have not thus far registered any abnormal increase, exceeding international rates, of sulfur dioxide gas, which is the best yardstick for measuring air pollution caused by the Kuwaiti oil well fires, despite the fact that the wells caught fire more than five months ago.

Al-Badi noted that three agencies in the UAE are conducting periodic tests on air pollution agents; namely, the Abu Dhabi municipality, the Dubayy municipality, and the Abu Dhabi National Oil Company. These agencies are conducting periodic tests using 20 stations spread around the country's coastal areas to measure the concentration of sulfur dioxide in the air, he added.

The health minister said there is a constant exchange of information on air pollution among the concerned agencies in the country and also among the GCC member states. A great deal of information also reaches the country from satellites and from the specialized world organizations as part of the country's efforts to enhance environmental safety.

Al-Badi expected that the near future will see a decrease in the rate of air pollution agents in the areas adjacent to the State of Kuwait, western Iran, and other border areas, thanks to the efforts to control and put out oil well fires, which have been continuing for approximately five months. More than 30 percent of these wells has been put out, he said.

The health minister added that reports the ministry has received from health agencies in the UAE indicate that there is no increase worth mentioning in diseases related to the air pollution caused by the Kuwaiti oil well fires when the current figures of these diseases are compared with those of previous years.

Black Smoke Reappears Over Iran's Southern Provinces

*91WN0486A Tehran KAYHAN INTERNATIONAL
in English 12 May 91 p 1*

[Text] Genaveh, Bushehr Prov., (IRNA)—With columns of thick polluting smoke moving into the Iranian airspace, the sky over this southern port city was blackened Friday.

The smoke blanketing the port city blocked the sunlight.

Local physicians blamed the spread of diseases such as diarrhea in the region on the consumption of foodstuff contaminated by the pollution caused by the burning oil wells in Kuwait.

Since oil wells in Kuwait were set afire by the Iraqi troops, this Persian Gulf port city has been time and again covered by thick clouds of smoke.

Meanwhile, sand storm and greasy clouds caused by the burning oil wells in Kuwait have been hanging over Kohgiluyeh and Boyer Ahmad Province, southwestern Iran, since Friday afternoon.

Due to heavy pollution residents have been advised to remain indoors and keep doors and windows shut until the air clears up.

The pollution is worse in Dogonbadan, which is closer to the Persian Gulf region.

Smoke From Kuwaiti Oil Wells Darkens Gachsaran in Iran

91WN0486B Tehran KAYHAN INTERNATIONAL in English 19 May 91 p 1

[Text] Gachsaran (Khuzestan), May 18 (IRNA)—Smoke rising from burning oil wells in Kuwait and mixed up with columns of dust has once again engulfed this southern Iranian city in thick air pollution.

According to a local official at the Environment Protection Organization the air pollution caused by advancing clouds of smoke has not only made it difficult for people to breathe but also endangered plant and marine life in the region.

He also cautioned against the "irreparable losses" that continued air pollution in the area is likely to bring on agricultural crops and orchards.

It was the second time in a month that Gachsaran was darkened by smoke billowing from Kuwaiti oil wells which were set ablaze by Saddam Hussein's occupation forces during their humiliating defeat in the Persian Gulf war.

Southern Iran has been among the areas worst hit by air pollution from the burning Kuwaiti oil wells, which are threatening to spark an ecological disaster for the Middle East and beyond on a gigantic scale.

Oil Slicks Spotted Off Iran's Southern Islands

91WN0486C Tehran KAYHAN INTERNATIONAL in English 20 May 91 p 1

[Text] Bushehr, May 19 (IRNA)—Oil slicks have been spotted off Iran's Persian Gulf island of 'Kharg' and the southern province of Hormuzgan.

According to informed sources, a slick encompassing an area was sighted within 11 miles of Kharg Island, Iran's main oil export terminal, on Friday afternoon.

Meanwhile, patches of slicks were seen moving towards the Qeshm Island and Bandar Abbas, the capital of Hormuzgan Province on Friday and Saturday.

Local environmental experts predict that the slicks, estimated to cover a 70-square km area, will reach Qeshm and Bandar Abbas within the next 48 hours. So far a large number of fish have died in waters affected by these slicks.

Meanwhile, according to reliable sources the slick is posing a serious threat to steam power generators and desalination plants in Bandar Abbas, Hormuzgan Province.

"Since the generator uses sea water for its cooling system, it has to be switched off if the 30 km long, two km wide slick which has broken into several patches, enters the pools" the source told IRNA.

He said booms have been installed at the mouth of the pools, to keep away the drifting patches of oil, which presently lie three km away from Bandar Abbas port, with winds blowing in the direction of the port-city.

The Port and Shipping Organization has rushed two machines for cleansing pollutants, in case the patches enter the Rajaie and Bahonar jetties of Bandar Abbas port.

EGYPT

Council Sets Up National Environmental Project

91WN0522A Cairo AL-AHRAM AL-DUWALI in Arabic 11 Jun 91 p 5

[Text] The High Council for Youth and Sports, under the chairmanship of Mr. 'Abd-al-Mun'im 'Imarah, has set up a national environmental project which includes a green belt that extends from Rafah westward to al-Sallum. The project will start in fiscal year 1991-92 and continue for ten years.

The council chairman stated that coordination has been achieved with the youth and sports directorates in the governorates, with the understanding that 1,000 youths and scouts [tali'] will participate in each agricultural period according to a work schedule that has been determined in agreement with the Agriculture Ministry.

The project aims to create an improved environment for agriculture and grazing, stop the desertification of agricultural areas, and add new agricultural areas. The national project includes the establishment of farms for the youths.

ISRAEL

Pollution, Salinity Affecting Domestic Water Sources

TA2006103791 Jerusalem THE JERUSALEM POST in English 20 Jun 91 p 1

[Report by David Rudge]

[Text] Pollution has already rendered 20 percent of the water drawn from the nation's coastal aquifer unsuitable for domestic use, and 20 percent of the coastal wells may have to be closed down entirely because of increasing salinity, according to a government expert.

Several wells have already been put out of operation because the water is no longer fit for either domestic or agricultural use, Dr. Yesha'ya Bar-Or, head of the Environment Ministry's water quality division, told THE POST yesterday. He warned that more wells will have to be shut in the future.

The main cause of the problem, according to Bar-Or, is overpumping, which has resulted in an influx of seawater as far as one kilometre from the coast.

"The situation is such that nearly a fifth of the wells which draw from the coastal aquifer will have to be closed completely over the next few years because of unacceptably high levels of salinity," said Bar-Or. Some might have to shut down sooner if the coming winter produces less than average amounts of rainfall to re-stock the aquifer.

The problem has been further exacerbated by pollutants percolating into ground water in the region. Bar-Or said the main culprits are domestic and industrial sewage, as well as fertilizers and pesticides used in agriculture. Many towns and villages in the coastal region still have inadequate sewage networks. Even in some of the more affluent neighborhoods such as Savyon and Herzliyya Pitu'ah, cesspits are still in use, he said. Antiquated methods of disposal are also used by many industrial enterprises.

The effect of pollution can be seen in increasing nitrate levels, said Bar-Or. Nearly 20 percent of wells drawing from the underground reservoir no longer serve domestic needs because of unacceptably high nitrate levels. This water is being diverted for farming use.

In the case of excessive salinity, however, water cannot be used even for farming because of its harmful effect on crops, especially citrus produce.

The underground reservoir, which runs from the Bin-yamina area in the north to the Gaza Strip in the south, supplies about 400 million cubic metres of fresh water per year—one fifth of the nation's requirements.

JORDAN

Ministry Announces Toxic Waste Dumping Site

91WN0485B Amman *JORDAN TIMES* in English
11 Apr 91 p 3

[Text] Amman (J.T.)—Toxic materials and poisonous waste from Jordanian industries can be dumped at a site nearly 50 km south east of here, according to a statement issued by the Ministry of Municipal and Rural Affairs and the Environment Wednesday.

The statement said that the ministry had embarked on arrangements to enable Jordanian companies to dump the waste at the site, located 55 km north east of Suwaqah, south of here, as of the end of May this year.

"Special arrangements will be taken to ensure public safety and the protection of the environment from pollution in accordance with international regulations and the Basel agreement of 1989," the statement said.

Jordan was one of 110 nations that signed the international agreement on controlling the process of dumping dangerous waste in the Swiss city of Basel in March 1989.

The agreement banned dumping dangerous waste in other countries, unless prior agreement had been secured, and outlined measures to be taken to facilitate international cooperation to implement its provisions.

The 28-point agreement provides for an exchange of information related to dumping dangerous waste and

means of protecting the environment. The agreement, known as the International Agreement on the Trans-boundary Movement of Perilous Waste, is being implemented in cooperation with the United Nations Environment Programme (UNEP).

The ministry has now assigned an 800 dunum plot of land, north east of Suwaqah, to be used as a dumping ground for dangerous materials and poisonous waste from factories, and has worked out special regulations for the dumping process to be supervised by a joint committee comprising representatives from the ministry and local industrial businesses, said the statement.

"No body or factory will be allowed to use the dumping ground for any purpose or dispose of waste in any manner without coordination with the committee," the statement added.

It said that the owner of a factory which dumps such waste at the site will be held personally responsible for any violation of the ministry's regulations.

The decision was announced by Minister of Municipal and Rural Affairs and the Environment Muhammad 'Abdal-Zabin at a meeting with owners of a number of factories which produce dangerous and poisonous waste.

The statement noted that several other meetings would be arranged to reach the most effective manner for managing the dumping site and the procedures of dumping and covering the poisonous materials.

"Each factory involved in the disposal of toxic materials will be submitting a list of the types of waste to be dumped and means of transporting and dumping the waste material," the statement pointed out.

It said that the Ministry of Municipal and Rural Affairs and the Environment would organise a field trip to the dumping site for representatives of concerned factories following the Id al-Fitr holiday.

Amman Region Water Distribution, Sewage Treatment Situation Outlined

91WN0485A Amman *JORDAN TIMES* in English
20 Apr 91 p 3

[Text] Amman (J.T.)—The Water Authority in the Amman region is now putting the finishing touches to a comprehensive plan for the distribution of water during the coming summer season when consumption normally increases largely due to an increase in the use of water for domestic purposes and the presence of visitors from the Gulf states, according to the head of the Amman Water Department Sinan Khalifa Friday.

In a statement to the Jordan News Agency, Petra, Mr. Khalifa said that the present level of water consumption in the Amman Governorate for domestic and industrial uses amounted to 210,000 cubic metres daily, expected to rise to 230,000 cubic metres per day during the coming summer.

Mr. Khalifa said that his department hoped to provide the required amounts of water from its own resources, namely the underground resources within the Greater Amman region.

"The Water Authority in the Amman region is determined to ensure sufficient water supplies to all parts of the governorate, in a fair manner, now that it has overcome many of the negative aspects that emerged in the past summer and after replacing many parts of the old water network in a number of regions," Mr. Khalifa said.

"Apart from replacing a 13-km long old pipes network, the Water Department in the Amman region last year carried out repair and maintenance work on vast areas of the water network to ensure that no water leakage and loss occurs and to make available sufficient amounts for distribution," said Khalifa.

He said that his department was responsible for the supply of drinking water to 200,914 subscribers in the Amman region, and was also responsible for ensuring sanitation services represented in the sewerage network for 56,866 subscribers in the same region.

Referring to the 1990 operations, Mr. Khalifa said that his department last year pumped 75 million cubic metres of water to the subscribers in the Amman Governorate, of which 55 per cent were pumped from the artesian wells and underground resources within the same governorate and the rest was pumped from other governorates to the Amman area.

Mr. Khalifa said that the following water basins supply the Amman region with water during the summer season: Azraq, Dulaylah, Suwaqah and Qatranah.

He said that in the winter limited amounts of water are pumped to Amman from the King 'Abdallah canal in the Jordan Valley, but the water "is of course purified on the way, through the main purification station located at Zayy, considered as one of the most modern purification stations in the whole Middle East."

During the winter, most of the water pumped to Amman comes from within the Amman Governorate, Mr. Khalifa said.

Referring to the sewerage system, Mr. Khalifa said that his department was not only responsible for connecting factories and households to the main system, but also monitoring the types of waste they produce and which is treated at the three treatment plants existing within the Amman region.

He said that in areas where no sewerage system has been laid yet, his department had made available a fleet of trucks which pump out the waste from the various cesspools and take it to the waste water treatment plants to prevent any pollution of the underground water resources on the one hand and pollution of the local areas within the Governorate of Amman on the other.

The Water Authority Department in Amman, he said, is responsible for the functioning of three treatment plants located at Abu-Nusayr, Madaba and al-Khirbat al-Samra'.

UN Chief Reports on Chernobyl Clean-Up
*LD2406221491 Moscow TASS in English 2121 GMT
24 Jun 91*

[By TASS correspondent Nikolay Maslov]

[Text] United Nations June 24 TASS—A report by United Nations Secretary-General Javier Perez de Cuellar to the 46th session of the UN General Assembly on international cooperation in mitigating and overcoming the aftermath of the Chernobyl accident has been circulated at the UN Headquarters.

The Chernobyl Nuclear Power Station accident is unique due to the fact that despite the long period of time that has passed since, its consequences are still unclear and will not be fully ascertained for many years to come, the report points out. The Chernobyl accident is of international character not only because its ruinous consequences are felt outside national borders but also by virtue of the fact that countries around the world are yet to assimilate important lessons arising from the accident aftermath.

The report reflects large-scale measures taken by Soviet authorities to reduce to the minimum the accident consequences. At the same time, it is pointed out that international, intergovernmental and nongovernmental organisations as well as private-sector institutions and individuals have begun to play an important role in rendering the necessary assistance and taking various experts-suggested measures.

Effective efforts to ensure international help are being made by the inter-agency target-oriented working group set up to stimulate and monitor UN activities in this respect.

Special attention in the report is drawn to the results of the mission of the UN coordinator for international cooperation in areas effected by the Chernobyl accident.

The coordinator, appointed by the UN secretary-general, was sent to the Soviet Union on a fact-finding mission. Due to it, many uncertainties, from the scientific point of view, concerning the Chernobyl problem have become evident.

The state of affairs in this respect is aggravated by the hard economic situation and other local factors. Manifest now are the deplorable position of many victims of the accident and the serious stress they experience owing to anxiety about the state of their health and by virtue of other less felt but still important factors.

On the initiative of the UN coordinator, all the sides concerned adopted the concept of a "master plan" to meet Soviet requirements for assistance and the resultant idea of a coordinated and agreed upon approach that would take into account all affected republics' requirements for help.

The UN chief's report expresses "hope that potential donors—governments, nongovernmental organisations, institutions, the private sector and individuals—will give practical and financial support to the realisation of the master plan.

This document, which sets out specific proposals to meet extraordinary humanitarian needs, is to be submitted to the donor countries' meeting, to be held in New York on September 20 under the chairmanship of the UN secretary-general.

Conclusions of Vienna Chernobyl Conference

Reviewed

*91WN0509B Moscow PRAVDA in Russian 29 May 91
Second Edition p 5*

[Article by PRAVDA correspondent I. Melnikov (Vienna): "Chernobyl Stress"]

[Text] The independent study of the consequences of the catastrophe which was made by experts was welcomed unambiguously.

The number of conferences, symposia, and consultative meetings dedicated to the Chernobyl accident is counted in the tens if not the hundreds. Many of them were international. However, it is unlikely that even one of them could, in terms of diversity and volume of the materials collected and analyzed, scarcely stand alongside the one that was held at the end of May within the walls of the Vienna Division of the United Nations.

The conference on evaluation of the study that independent experts conducted in areas suffering from the Chernobyl catastrophe brought together scientists from 34 countries, as well as representatives of tens of international organizations. This "Areopagus of authorities" was to analyze the conclusions to which experts had arrived after a year and a half of study and to draw an authentic and understandable picture of today's Chernobyl realities.

But first, the preceding history of the Vienna forum. In the spring of 1989 our government appealed to the International Atomic Energy Agency [IAEA], asking for "a study by experts of the concept which was developed in the USSR of safe residence by the populace in areas that had been subjected to radioactive contamination as a result of the accident at the Chernobyl AES [Nuclear Electric Power Station]." One did not have to wait for a response. Soon the IAEA, together with the World Health Organization, the Commission of European Associations, the UN Food and Agriculture Organization, and the UN Scientific Committee on the Effects of Nuclear Radiation established a project within the framework of which a group of independent international experts began to operate.

At the finish line the independent experts had come up with almost a thousand pages of summary studies.

Just what were the conclusions of the impact assessment, in the conduct of which 200 scientists from some 20 countries participated and the responsive direction of which was accomplished by the International Consultative Committee? The main conclusion is cited in the chapter, "The Effect on Health." The experts noted substantial violations, not caused by radiation, of the health of the residents both of the polluted communities investigated and of the control populations that were studied within the framework of the project. But there were no violations of

health of any kind directly connected with the effect of radiation exposure. At the same time, the report noted, the accident involved substantial negative psychological consequences that were expressed in an increased feeling of worry and the emergence of stress because of a constant feeling of uncertainty. This tendency was traced even beyond the limits of the contaminated regions.

What kind of a grade did the foreign colleagues give to Soviet scientists, particularly their "concept of safe residence in areas affected by the catastrophe"? This grade was completely satisfactory: the methodology of our specialists was adopted, and high professionalism was noted in compilation of the maps of radioactive poisoning of the locality. The Soviet experts also were ready for criticism, but its arrows flew from an unexpected direction: we were reproached for a certain conservatism in determining the probability evaluations of radiation dosages and contamination levels. As the Western professors indicate, these evaluations were overstated by almost double for a large number of parameters.

I was reminded of the phrase, spoken by Chairman of the International Consultative Committee Isuzo Shigematsu, on the forum's opening day: only time will enable the actual meaning of the contribution made by the experts to be evaluated. Behind these words, it seems, there stood not only the modesty of the Japanese professor and his associates. More likely it was a signal that the international study by experts did not assume the role of an inerrant oracle. The rigid calendar and the shortage of experimental data actually narrowed the field of the experts' activity. No kind of scientific scrupulosity could erase such "white blemishes" as, for example, the condition of the 100,000 local residents who were evacuated, which was cited within the framework of the project, and the 600,000 "liquidators"—people who had struggled with the consequences of the accident. It is not surprising that the discussion at the conference, day by day, became increasingly lively.

The attitude toward the recommendations of the independent experts' study proved to be ambiguous. On the last day of the conference, the representatives of Belorussia and the Ukraine came out with a joint announcement. After having recognized the competence and integrity of the international experts, they nevertheless expressed concern for their "excessive optimism" in regard to both the present and the long-term consequences of the Chernobyl catastrophe. The Belorussian and Ukrainian representatives announced that the summary of the project cannot be regarded as conclusive. But is it not clear that the pronouncements made on the last day of the forum by Chairman of the International Consultative Committee Isuzo Shigematsu and IAEA General Director Hans Blix were not in unison with this thought? Both emphasized the vital necessity of tirelessly continuing global collaboration in studying the consequences of Chernobyl. And that, obviously, in the near future a search must be made for a compromise model of that collaboration which would organize all the interested parties.

In conclusion, there is still one aspect of the Chernobyl problem which was not brought out at the proscenium

during the discussions but was invariably held up for the conference's participants to see. This was international help—technical and financial. It is completely understandable that the conclusions of the experts' study "about overstated evaluations" of the danger for people's health and for the state of the environment can in a definite situation cool the enthusiasm of the "donor" states. Two of the people I talked with gave me to understand how undesirable the consequences are.

"We cannot get along without help," Deputy Chief of the Government of Belorussia Ivan Kenik admitted. In the last war a fourth of the republic's residents perished, and right now a fifth of them have been injured. We severely need medical equipment which will enable us to treat people on the spot and not bring them to the ends of the earth for healing."

"We now stand on the threshold of a very interesting era," says Chairman of the Committee on Elimination of the Consequences of the Accident at the Chernobyl AES Viktor Gubanov—execution of the resolution of the UN General Assembly on the extension of international aid. Jointly with the republics, we have developed tens of concrete programs, beginning with the urgent needs of regional hospitals and ending with treatment of the most complicated types of illnesses. What is concealed here is that the quantity and quality of foreign assistance depend upon the recommendations of the impact assessment and the frame of mind of the Vienna conference."

Biophysics Institute Director on Chernobyl Health Statistics

91WN0509A Moscow ARGUMENTY I FAKTY
in Russian No 21, Jun 91 p 6

[Interview of L. Ilin, academician of the AMN SSSR [USSR Academy of Medical Sciences] and director of the AMN SSSR Biophysics Institute, by V. Romanenko and O. Izvekova: "My Conscience as a Scientist Is Clear...."]

[Text] Chernobyl: The total damage from the catastrophe is 170-215 billion rubles.

L. Ilin, director of the AMN SSSR Biophysics Institute, a man about whom, for the past five years perhaps, most of the criticism for covering up the truth about Chernobyl has been heard, answers our correspondents' questions.

[Romanenko and Izvekova] In the opinion of Ukrainian SSR Minister of Public Health Yu. Spizhenko, "...a lie and a half-truth, the informational dictation of the Center, and supersecretiveness about the true radiation situation outside the 30-kilometer zone have done their job—about 150,000 residents of the Ukraine have received radiation doses of the thyroid gland that exceed the permissible doses. And the thyroid glands of 5,000 children and the families of thousands of adults have received 200 rads, which, under present norms, exceeds the permissible limits 30-fold to 40-fold!"

Today the capital's AMN SSSR Biophysics Institute has been forced to recognize the connection of the accident with the spread of the illness of thyroid-gland cancer, but

still "does not see" the connection of that large-scale pathology of the blood that is being observed today with the radiation.

You do not feel a personal responsibility for the fact that people were not told the truth five years ago?

[Ilin] Five years ago no one knew the whole truth. And this is completely natural. The information was not complete. My conscience as a scientist is absolutely clear. All this was classified. That which we knew, that which could be accepted, we accepted, and when I am asked, "What would you do then?", I would like to have seen these people at our place.

[Romanenko and Izvekova] How many people were victims of the accident at the Chernobyl Nuclear Electric Power Station?

[Ilin] According to data of the AMN SSSR Institute of Medical Radiology, 244,000 liquidators and 536,000 evacuees and people who live in the areas of rigid monitoring are included in the state registry. During the past month the institute received information about 10,000 people under the auspices of the Ministry of Defense (officer personnel), 8,000 MVD [Ministry of Internal Affairs] officers, and about 34,000 soldiers on their first term of service. I do not believe the last figure very much. I think it is larger.

Only 141,000 people have individual dosimetry, that is, practically 100,000 people do not have papers about dosages.

In 1986, 121,000 people passed through the Chernobyl site, 75,000 in 1987, 22,600 in 1988, and 8,000 in 1989.

The characteristics of the death rate among liquidators throughout the Ukraine, Russia, and Belorussia for the group 20 to 50 years of age practically differs in no way from the average mortality rate for these republics.

In all, 1,134 people (ages 20-49 years) died during these years. This is for the liquidators. The overall death rate for the USSR among people 20-30 years of age is in the range of 2.2-2.6 per 100,000 persons. But for the registry (people of this age were taken) it is 1.5 persons (that is, 30 percent lower than for the country as a whole).

[Romanenko and Izvekova] After the accident you proposed a 35-ber [rem units] concentration for evaluating the degree of radiation effect. Today many scientists consider it mistaken. You are confident of it, as before?

[Ilin] Absolutely! I have here on the table the report of the International Project on Chernobyl, in which more than 20 countries of the world took part. A group of deputies appealed at one time to N. Ryzhkov with the request to conduct an independent international study by experts, since they did not believe Soviet specialists.

The independent international experts' study termed our concept, more precisely the 35-ber level of intervention proposed by the national commission on radiation protection, too conservative. They would name the permissible

dose as two-fold to three-fold higher. Yet today we are accused of genocide of the Belorussian people.

The main conclusions of the experts: they did not find in the rayons which had been harmed any kind of changes in comparison with the control rayons, which would indicate the possible effect of the radiation on people. All the decisions of Soviet specialists at the early phase of the accident were correct and were taken in accordance with standards that have been developed by us and abroad.

I suggest that right here in our country everything will be done by certain people to repudiate the decisions of the commission of independent experts.

[Romanenko and O. Izvekova] Do you consider that your critics are guided by purely political and not professional considerations?

[Ilin] Many have made a career of this criticism....At a time when practical questions were not being solved for years. For example, it was the efforts of scientists of our institute which created a special filter for purifying milk of radioactive cesium. The filter is a nontextile material in the structure of which, by means of special chemical techniques, a substance was introduced that selectively binds the cesium. It reduced the radioactivity of milk 20-to 40-fold, that is, it became practically pure, without losing its taste and other qualities. If these filters had been introduced in time, a portion of the people would not have been resettled.

One filter costs about 4 kopecks. As a minimum, fewer than 10 million of them are needed per year. But our existing system does not allow this development to be introduced quickly. We are ready to send the technology and the documentation.

Estimates of May 1986 Chernobyl Fallout in Kiev Disputed

91WN0506B Moscow *TRUD* in Russian 4 Jun 91 p 3

[Article by V. Tokarevskiy, doctor of physical-mathematical sciences, section head at the UkrSSR Academy of Sciences Nuclear Studies Institute: "Chernobyl: Echo of a Tragedy. Glasnost With Partiality"]

[Text] May 1986—once again about the demonstration in Kiev.

There is a most definite circle of Soviet scientists who purposefully propagandize the conception of the insignificance of the medical-biological consequences of the Chernobyl catastrophe. There are also those who defend their ideas, as for example the Canadian physicist from the University of Manitoba, Iovan V. Iovanovich, who published his article: "Glasnost and Partiality" in the Ukraine. Iovanovich says that the speech on Chernobyl by USSR People's Deputy Yu. Shcherbak, chairman of the Ukrainian ecology association "Green World", and his accusations addressed to the Ukrainian government regarding the May 1 demonstration on the streets of radioisotope-bombarded Kiev, were a gross error. The Canadian believes that the figure presented by writer Yu. Shcherbak,

who stated that the radiation level in Kiev in those days of May 1986 was 100 times higher than the maximum allowable level, is a monstrous distortion of the truth.

Moreover, the Canadian physicist maintains that incompetence and political intrigue have given rise to a new "Lysenkoism" in the Soviet Union. And while in the 30's the antiscientific theories of Academician Trofim Lysenko destroyed many true scientists and set back Soviet genetics by decades, today's Chernobyl "Lysenkoism" is capable of inflicting almost as much harm.

The accusations are serious and demand commentary.

The radioactive cloud from Chernobyl reached Kiev on the morning of 30 April 1986. The next day, the Mayday demonstration was held in the city...

According to Soviet as well as American data, which I. Iovanovich presents in his article, the radiation levels in the city fluctuated during those days from 3 to 0.32 milliroentgen per hour. The primary component of the aerosol cloud was radioactive iodine-131. If we average these figures, then according to the computations of the Canadian physicist, the children, of whom there were many at the demonstration, received 5 milliroentgen of external and from 2 to 5 milliroentgen of internal radiation.

One may receive this dose by flying on a jet airplane from Kiev to Vladivostok and back. To speak of the harm of such radiation, he says, is simply laughable.

All these figures evoke for me at least a feeling of distressing confusion.

...The cloud which covered Kiev at 11:00 a.m. on 30 April turned the air which we breathe, 22,000 liters of which we pass through our lungs every day, into a radioactive environment. During those days it saturated the blood not only with oxygen, but also with radionuclides. And the main blow was dealt to the Kiev residents not through external radiation, which is really computed with the aid of arithmetic rules, but through internal radiation.

Aleksandr Linev, a professor at the UkrSSR Academy of Sciences Nuclear Studies Institute, conducted regular measurements of the gamma background at a single location in Kiev, beginning with 30 April. The level of radiation changed within an interval of several hours: It dropped from 5 to 0.6 milliroentgens, and then it again rose to 2.2. Such surges continued over a period of two weeks. I am focusing attention on them because they reflect the fluctuations of the so-called volume activity of the atmospheric air—a most important constant in computing received doses. A specialist will easily tell you that in one hour an adult located in such a cloud received two yearly norms to his thyroid gland—around 3 rem [roentgen equivalent, man].

In case you have forgotten, I. Iovanovich cited somewhat different doses: No more than 10 millirem in the five hours of the demonstration.

Yet there was not only the iodine impact. An analysis of the air filters at hydrometeorological stations conducted at

our institute during those days showed that the level of volume activity exceeded the maximal levels by hundreds and thousands of times, not only for iodine- 131, but also for tellurium-132, cesium-137, and certain other isotopes.

Thus, in my opinion, the discussion of the Canadian physicist about the Chernobyl "Lysenkoism" seems hardly appropriate.

Belorussian Cancer Cases Increase Following Chernobyl

*LD2106184391 Vilnius Radio Vilnius Network
in Belorussian 1922 GMT 19 Jun 91*

[Text] The Gomel Oblast Party Committee reports that in April 1986, before the Chernobyl catastrophe, 202 cancer cases per 100,000 people were registered in Gomel Oblast. In 1991, the number of sick people was 246 per 100,000. The number of thyroid gland disease cases among children has increased by ninefold.

Smolensk Nuclear Plant Blessed by Church; Local Fears Persist

*PM2806133091 Moscow SOVETSKAYA ROSSIYA
in Russian 26 Jun 91 First Edition p 6*

[I. Krasnovskiy report: "God Save the AES [Nuclear Electric Power Station]! Will Prayer Protect the Nuclear Reactors?"]

[Text] Smolensk—What have we come to... The Smolensk AES [nuclear electric power station]'s reactors were blessed with holy water the other day. It's hard to believe, but it's a fact. Moreover, the priests did this at the request of the AES's leadership. The ceremony was solemn, and was attended not only by inhabitants of Desnogorsk and power station workers, but also the Smolensk Oblispolkom [Oblast Soviet Executive Committee] leaders.

Now, no doubt, after the next incident at the Smolensk AES, its leaders and personnel will be able to say bravely: "Leave everything to the will of God!..". And, to all appearances, they will have to enunciate this phrase often: The Smolensk AES is notorious for the many incidents which have taken place, some in the first reactor, some in the second. And the radiophobia which the inhabitants of Smolensk and the neighboring AES satellite town of Desnogorsk are suffering from is not coincidental. First a fire suddenly breaks out in power unit No. 2 due to a short circuit of a "cable not up to design specifications" and its not being laid in accordance with the rules, then a transformer suddenly blows up, then there is a flare-up in the radioactive waste store..

You can spend a lot of time going through the list of similar "surprises" that the Smolensk AES has served up in recent years. But what is the point! The oblast's inhabitants have not yet found a common language with the AES's leadership. A special service has been established at the power station to liaise with the public and the local press, and staff assigned to it. But the contacts amounted to the nuclear power station workers taking the obstinate

press and the "greens" to task, when the latter had bombarded them in the newspaper columns with hostile questions. They were on the point of discussing installing dosimeters for communal use in the Smolensk region towns and rayon centers, but yet again this did not go beyond arguments that these dosimeters would put the population "on edge."

The Smolensk population is worried—and with reason—about the nuclear power station's degree of reliability, and all of a sudden they throw up the idea of "establishing a fund to modernize the AES," for which only a billion or so will be required. It is understandable that no one burned with the desire to run immediately to wait in like at the savings bank windows and, to the music of Pakhmutova's song "We Are all Chernobyl's Children," hand over their "hard-earned cash" to rebuild it. And then they thought up the course of action which materialized the other day—they turned to the church for support.

Of course, radiophobia has in recent years done much damage to our economy. Someone maliciously pointed out: "Soon instead of the dictatorship of the proletariat, there will be a dictatorship of the Geiger counter." But, putting our hands on our hearts, the majority of us are probably not such intransigent opponents of nuclear power. And the demand to close the nuclear power stations is now out of the question. It is simply that any normal person has a small but naive dream: You want to be sure that you are guaranteed the maximum safety, that a "sarcophagus for glasnost" will not be built around industrially hazardous facilities. Alas, for the moment there is no such certainty. And the nuclear power station workers' bizarre actions and their appeals to the deity only pour fuel on the fires of the emotions.

**IAEA Approves Site for Crimea Nuclear Plant;
'Greens' Disagree**
*OW2406131991 Moscow INTERFAX in English
1800 GMT 21 Jun 91*

[Following item transmitted via KYODO]

[Text] The International Atomic Energy Agency [IAEA] has found acceptable the seismic level of the site near the town of Shchelkino in the Crimea chosen for constructing an atomic power plant. At the same time a member of the Agency who had visited the site remarked to the journalist that he had "seen nowhere" such a low quality of building works.

With this assessment by international experts the ecological organizations of the Crimea have held a number of protest actions accusing the Agency of bias. According to the "Greens", the structure of the future power plant have not been properly tested. The quality and conditions of the building works, in their opinion, far from meet the level of the seismic danger.

The verdict of the Agency was taken by the ecologists as an attempt by the Soviet Ministry of Atomic Energy—which had invited and paid the Agency's experts—to revoke the

decision of the local authorities to stop the construction of the plant and to re-design it as a conventional power plant working on natural gas.

Testing Firm Compares Ukraine, Semipalatinsk Radiation Levels

*91WN0502A Kiev KOMSOMOLSKOYE ZNAMYA
in Russian 8 May 91 pp 4-5*

[Article by V. Ostapenko: "We Live at the Epicenter of a Nuclear Explosion; This Conclusion Was Reached by the Protiy Corporation of Independent Radioecologists After a Comparative Study of the Radioactive Contamination of the Ukraine and the Semipalatinsk Test Range"]

[Text] Our corporation Protiy [Proteus], together with the PGO [Geological Production Association] Sevukrgeologiya [Northern Ukraine Geology], and the Center for Ecological Problems of the Ukrainian Academy of Sciences, is carrying out a radiological evaluation and radiological monitoring of both the entire territory of the Ukraine as well as beyond it, using today's most modern metering equipment.

As is known, everything becomes comprehensible in a comparison. For this reason, in September-October 1990, at the request of the public organizations in northeastern Kazakhstan, we carried out work on a radioecological assessment of the Semipalatinsk Nuclear Test Range and the zone of its impact over a territory of 200,000 km².

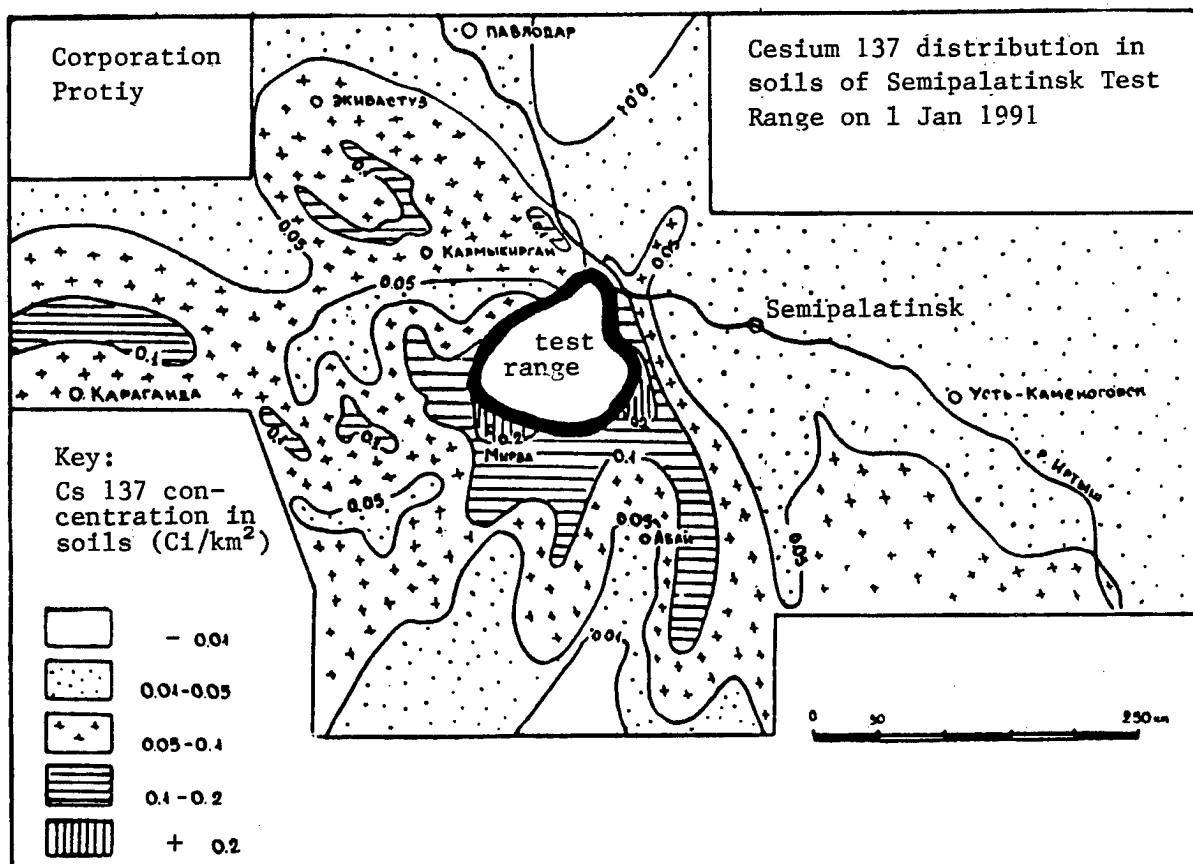
Within the limits of the test range over an area of 11,000 km², we noted a series of anomalously high radioactivity fields related to the test facilities such as the craters of ground-level explosions, the test holes and test galleries and so forth. The concentrations of cesium-137 in the loose material comprising the sides of the craters themselves and forming slide and bottom deposits varied within the limits of 1-1,000 nanocuries/kg (1 nanocurie = 0.000,000,001 curie [Ci]). Here at a distance of 0.5-1.5 km from the crater edge, the concentrations of the radionuclides in the soils decline to the background levels and a change in the radiation background is not recorded.

Now let us compare. According to the results of the work done by the PGO Sevukrgeologiya and the Institute for Nuclear Research under the Ukrainian Academy of Sciences, by 1985, the background contents of cesium-137 in the upper five-cm layer of Ukrainian virginland soils and formed with the global fallout as a result of nuclear explosions in the atmosphere at the end of the 1950s and the beginning of the 1960s were hundredths of a nanocurie/kg or thousandths or a few hundredths of a curie/km². After Chernobyl, the average cesium-137 concentrations in the five-cm layer of virginland soils were: for Kiev 10 nanocuries/kg (0.7 curie/km²), for Narodichi, 200 nanocuries/kg (15 curies/km²), and for the evacuated town of Pripyat, over 1,300 nanocuries/kg (over 100 curies/km²). The conclusions come automatically, namely millions of people live on a significant portion of Ukrainian territory which in terms of the density of radionuclide contamination is equal to the epicenters of nuclear explosions.

Characteristic of the test facilities at the Semipalatinsk Nuclear Test Range are anomalously low coefficients for the movement of the radionuclides from the soil into vegetation and fungi and these are from 0.00016 to 0.04. This is why in individual areas with a contamination density for cesium-137 of 50-100 curies/km², its concentrations in the biomass samples were maximally low. This circumstance was caused by the high-temperature insoluble forms of the radionuclide compounds. Precisely the low coefficients for the accumulation of cesium-137 by the plants at the nuclear testing facilities and the miscomprehension of the basic geochemical processes made it possible for a number of our Soviet venerable scientists in

behaves significantly more aggressively. In the soddy podzolic soils of the Polesye as the most contributing to migration, the coefficients for cesium-137 accumulation are virtually one, that is, beginning with 1.0 curie/km² we obtain a "dirty" product even according to domestic standards.

The cesium-137 contents in the soils outside the Semipalatinsk Test Range are clearly shown in the map. In comparison with the map of contamination in the Ukraine, we can see that in the regions directly adjacent to the range the soil cesium-137 contamination density is somewhat lower than in the Ukraine which is one of the least afflicted regions of the Ukraine after Chernobyl....



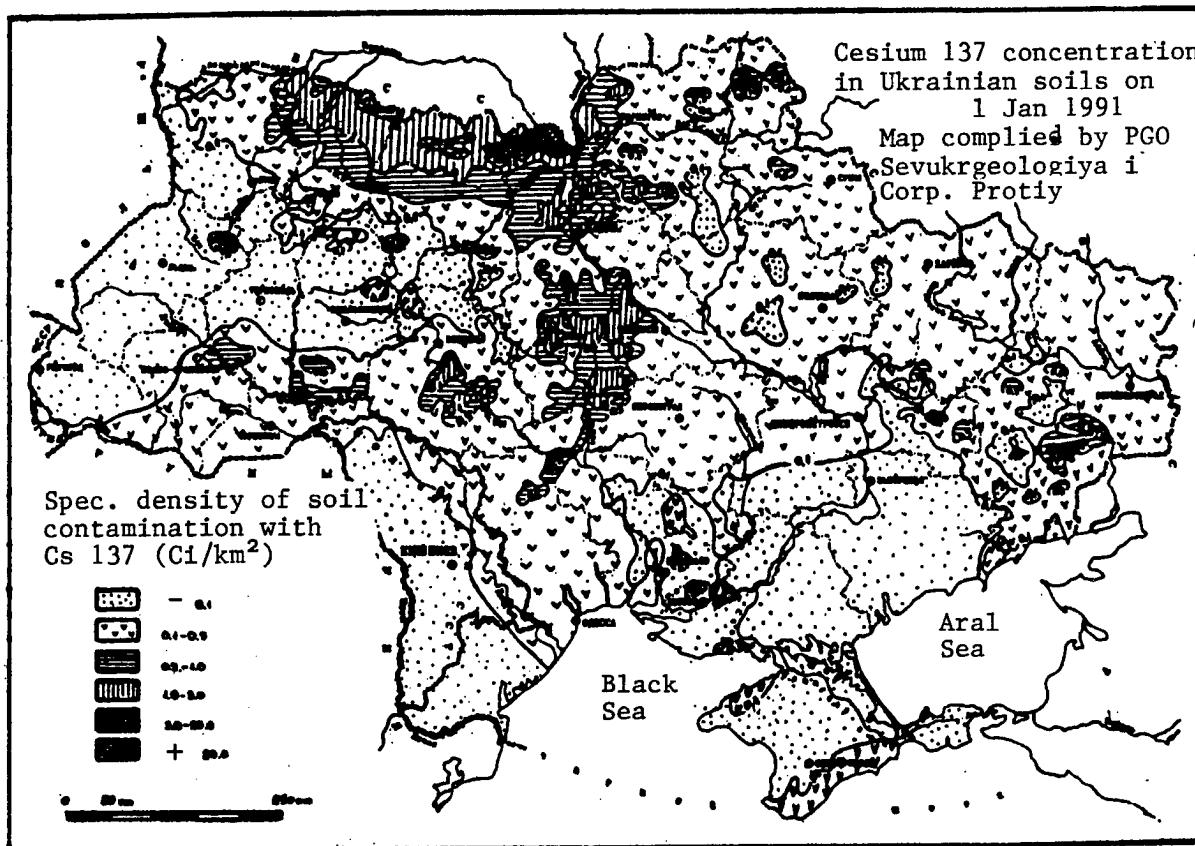
Cesium-137 Distribution in Soils of Semipalatinsk Test Range on 1 January 1991

1986-1988 to defend the thesis in the Ukraine of the possibility of obtaining clean agricultural products from territories with a contamination density for cesium-137 of 40 and more curies/km².

In contrast to the Semipalatinsk, the Chernobyl cesium which is in incomparably smaller and low-temperature particles

The Protiy Corporation of Independent Radioecologists of the Ukraine provides gratis consultation on the contamination of the entire republic territory by radionuclides and heavy metals.

The address of the corporation: Kiev, Pushkinskaya Street 9, telephone: 228-24-53.



Cesium-137 Concentration in Ukrainian Soils on 1 January 1991

Concerns Surrounding Semipalatinsk Nuclear Test Site Viewed

PM2606123191 Moscow Central Television First Program Network in Russian 1400 GMT 8 Jun 91

[“Epicenter” documentary on the Semipalatinsk nuclear test site in Kazakhstan and its history. Figures in parentheses indicate time in mins/secs since start of program]

[Excerpts] [0000] [N.Z. Tsubko, subsequently identified by caption as test site veteran] In those years morale was so high that we all came to work here willingly. We never felt tired. We knew that this work was necessary. We all had only one objective—to forestall an attack on the Soviet Union from capitalist countries. We were content with our lives because we knew that there was a good reason for this work—we were defending our motherland.

[Unidentified voice over old footage] That was in 1947. N.Z. Tsubko was a lieutenant then. She served in the MGB [Ministry of State Security]. One day she was summoned by her commander and dispatched within 48 hours to Eastern Kazakhstan, together with her son. There, on the banks of the Irtysh River, top-secret construction work was under way. The purpose of this work was kept secret even from officers of the MGB.

[N. Tsubko] After the first explosions concerns began to arise about their affects on health. And the civilians among us quietly slipped away.

[Unidentified voice over 1952 footage marked “top secret” and captioned “Tests of a powerful hydrogen bomb”] Location—the test site. A site above which an explosion will be carried out has been prepared. At the center of the site is the target. Objects which are to be tested are placed around the site and readied for the tests. They include industrial installations and houses. The tests are being conducted with a view to obtaining new data to be used in the elaboration of effective methods of protecting cities and industrial centers.

[G. Tsubko, identified by caption] It was a sunny day, and suddenly we saw a second sun. It rose up from the earth—that’s what it looked like—it rose up to a certain height, and then a mushroom cloud appeared—black, black, black smoke forming a cloud. We were intrigued. But there was no one we could ask about it. When we asked, I can’t remember whom I asked, probably at home, I was told: Don’t say you saw anything, you saw nothing. I said: But... They said: You saw NOTHING. So I understood that I had to keep my mouth shut. What else could I do?

[Unidentified voice over old footage] It was back during the war, several academicians were summoned to the government. Their opinion was sought. And Ioffe recommended that Kurchatov be put in charge of the whole operation. He was known as a very good physicist. And Kurchatov began to get a big scientific team together.

[Footage of bomb being dropped from aircraft] [Local resident Talgat Slyambekov from Karaul Village, subsequently identified by caption] Suddenly we saw a very bright light. It was brighter than the sun. We had to close our eyes. Then a mushroom cloud rose up. Then, about an hour and a half or two hours later the military arrived by air [video shows helicopter arriving] without special suits or gas masks, and took down our names—Ivanov, Osetrov... And a day later they came up with some kind of measuring instrument. We had no idea at the time what kind of instrument it was—it appears that it was a radiation counter. We did not suspect anything at that time. Only afterward, after [word indistinct] years, when people began dying of leukemia, of cancer, of anemia, did we realize that we had been used as guinea pigs.

[Unidentified voice over video of test area] The test site became deserted. Residential settlements located near the test site were evacuated. The zone comprised more than 700 population settlements with a total of more than 50,000 inhabitants. Around 1,000 officers and men, representatives of the security service, were sent to the population centers to carry out explanatory work, organize the evacuation of people, and carry out radiation research.

[A.F. Tsib, director of USSR Academy of Medical Sciences Medical Radiology Scientific Research Institute, identified by caption] The history of the test site can be divided into two periods. The first period, from 1949 through 1963, is the period of above-ground tests, the period of nuclear tests in the atmosphere. At that time, it is true, contamination did occur. But during the second period, the period of underground tests, there has been absolutely no radioactive contamination detected in this area over and above the radiation safety limits laid down for category "B."

[Unidentified voice over video] One of the most important research objectives was to determine the nature of the possible effects on people and to test the effectiveness of means of protection. To this end test animals were placed in houses and industrial premises, in various kinds of shelters and refuges, and in other installations. Appropriate measuring instruments were also installed in the same locations, so as to determine at what levels of shock wave, light radiation, and penetrating radiation the kill took place.

[Unidentified man] There was an explosion in September, or was it August... it was either September or August... no, the first explosion was in August 1949.

[Second man] There was a massive explosion... we took the dogs, cows, and horses and drove them to the woods, we ran and screamed just like in wartime.

[First man] Just like during the war.

[Second man] Then after that explosion the mushroom appeared, it is impossible to describe, it was frightening to watch.

[First man] And it stayed there for 24 hours, 24 HOURS...

[Second man] And the noise was like a hurricane, a real hurricane...

[First man] The wind was very strong, just like when an aircraft is landing, a proper hurricane in the woods...

[Unidentified woman] The trees were flattened, we lived near the cordon, and the trees were bent right down to the ground...

[Second man] After that people began to die, even children began to die...

[Unidentified voice over 1952 footage] At the test area's laboratory settlement a considerable distance from the test site preparations for the upcoming tests are under way. In this laboratory instruments are being adjusted and tested so they can be used to study the properties of the shock wave, the main destructive component of the explosion.

[Academician M.A. Sadovskiy, identified by caption subsequently] Our task was to measure everything at the moment of the explosion. But we had absolutely no idea what the measurements would be. And when it came to radiation, the range was simply incredible—six orders of magnitude, that is to say, we did not know whether we would be measuring a unit or a million units. [0940] [passage omitted—camera crew arrives at Semipalatinsk nuclear test site, soldier explains regulations, correspondent interviews schoolchildren]

[1100] [Correspondent, to serviceman putting up decorations for 72d anniversary of the October Revolution] Would you say life was terrible here?

[Serviceman] It is just like in any other city.

[Correspondent] But the ground rocks from time to time, doesn't it?

[Serviceman] It is barely audible.

[Correspondent] And what about radiation?

[Serviceman] There is no radiation here. Background radiation is higher in Moscow than it is here.

[Correspondent] Specialists say that the normal radiation, that is, background gamma radiation in Moscow, for example, totals around 17 microroentgen per hour.

[S.G. Smagulov, head of Semipalatinsk nuclear test site radiation service, identified by caption subsequently] The radiation counter shows 14 microroentgens. We are standing one meter from the head of the borehole.

[F.F. Safonov, deputy head of the Semipalatinsk nuclear test site] We are now standing at the head of the borehole where an explosion was carried out 2 September. You know from the press that its yield was somewhere in the region of 20 kilotonnes at a depth of just over 500 meters. [1153] [passage omitted—old footage of explosion filmed from 60 km away and effects of shock wave on test

installations; complaints from local residents; statements by local officials claiming that radiation situation around test site has been entirely normal; film of U.S. nuclear testing in Pacific; comments by I.V. Kazachevskiy of Nuclear Physics Institute on his visit to the test site]

[3021] [Unidentified voice over video of Chernobyl at the time of the accident] Detachments of the test site's radiation service took part in eliminating the consequences of the accident at the Chernobyl Nuclear Power Station.

[S.G. Smagulov, head of Semipalatinsk nuclear test site radiation service, identified by caption] My people also worked in the zone under the reactor—four of my people—and the radiation levels there were no joke, of course. They cleared a passage [words indistinct] and one meter to the side of this passage the levels were between 500 and 1,000 roentgen [word indistinct]. And people worked in these levels. I myself was in charge of the decontamination of the roof. At that time it was realized that the radiation levels on the roof of the No. 4 unit were in excess of 10,000 roentgen. Yet people were sent out there.

[Unidentified voice over video] During the first days after the Chernobyl accident an air bridge between the Ukraine and Kazakhstan was established. In the course of a year 13,000 samples from the accident zone were analyzed at the test site.

[Unidentified laboratory assistant] The point is that radioactivity is a potentially dangerous natural phenomenon. And to prevent this danger from becoming real, it must be constantly monitored and studied. Therefore we constantly take samples, these samples are stored here, and they will be stored here for a considerable time so that we can return to them and measure them again and show that they are not as dangerous as it might seem. Here you can see that slag removed directly from an underground nuclear explosion site at installation No. 190 produces a reading of around 6 milliroentgen per hour in the immediate vicinity of the surface of the slag. This means that while shooting this film the entire camera team received a dose of no more than approximately 1, 2, or perhaps 5 percent of what each one of us receives during the annual [word indistinct] screening. [3247] [passage omitted—principle of underground explosions; footage of underground explosion and people's protests; comments by Petrusenko, Pavlovich on problematic nature of the situation; details about Nevada-Semipalatinsk Movement]

[4300] [V.I. Gerasimov, chief of a Defense Ministry main directorate, identified by caption] Obviously, at the present time it is impossible unilaterally to end tests. We need the tests. Since the weapons exist, they must be tested, especially those which are already part of the arsenals. In addition, new weapons are being developed which must also be tested, because if we do not develop new weapons we will fall behind the Americans. That is to say the parity which currently underpins peace will be impaired. And third, physicists carry on working and thinking, new ideas are born, and these ideas have to be

tested, tested through experiments, above all. [4347] [passage omitted—local and other views on whether the test site should be closed down]

[4815] [A.D. Ilyenko, head of Semipalatinsk nuclear test site, identified by caption] If our government or the Supreme Soviet hurried up and adopted a decision, the uncertainty and the ballyhoo currently surround the test site would be cut short. There would be certainty in the world as to when the tests at the Semipalatinsk test site will stop. A line would be drawn under all this. And this alone would already be a plus.

[Marat Kulmanov, director of Health Care Center] Let us weigh up everything, let us calculate all the pluses and the minuses. Let us calculate what we are losing and what we are gaining as a result of this today. And what we stand to lose in the future. What have we already lost? Who can say? Well, no one. Everything is constantly kept secret. Everything is classified. Everything is hidden away. There is no access. Let us get to the bottom of all this. Let us tell the whole truth. And then the people will understand.

[Unidentified voice over video] The first steps in the dialogue with the distrustful people have already been taken.

[Correspondent] The Nuclear Physics Institute has embarked on the production of radiation monitors for collective use and their installation.

[Unidentified scientist] Yes, we have already done this. They have now been installed in Karaganda and in Semipalatinsk. This was an idea of our institute to ensure that there is real glasnost, nonbureaucratic glasnost, as they say, so that everyone can see for themselves. [Video shows radiation counter installed on a building]

[F.F. Safonov, deputy head of Semipalatinsk nuclear test site] Well, and if people do not have faith in this commission, we will insist that an international commission is sent in to prove that underground nuclear tests in no way affect people's health. [4943]

Locals Blame Tree Disease on Radiation From Military Site

PM1906133191 Moscow KOMSOMOLSKAYA PRAVDA in Russian 18 Jun 91 p 1

[V. Nelyubin report: "But at That Time"]

[Text] Deputies of Rybinskoye Village Soviet, which is in the south of Krasnoyarsk Kray, have sounded the alarm: The leaves of aspens throughout the district have unexpectedly turned yellow. The newspaper KRASNOYARSKIY RABOCHIY has reported that they associate this phenomenon of nature with radiation. For one of the "post office box numbers" [secret enterprises] of the military-industrial complex is located right here, in Rybinskiy Rayon.

Environmental Concerns in Chemical Weapons Destruction

91WC0115B Moscow *ROSSIYA* in Russian No 17, 3 May 91 p 4

[Interview with Sergey Yufit, doctor of chemical sciences and expert with the Union of Social Ecology, conducted by Yevgeniy Vlasov: "Arsenals That Are Unneeded"; date and place of interview not given]

[Text] At a recent Moscow conference on chemical disarmament that was organized by the Soviet Peace Committee, reports were given by highly prominent specialists in chemical weapons from several countries, and parliamentarians, scientists and military personnel exchanged views. Several original ideas were expressed by Sergey Yufit, doctor of chemical sciences and expert with the Union of Social Ecology.

[Yufit] We need a fundamentally new approach to the very problem of chemical disarmament. Since international law forbids the use of chemical weapons, one might provisionally assume that it is not the weapons but very dangerous, highly toxic substances that are subject to destruction. Thus, the problem takes on an environmental character. It is necessary, once an appropriate international agreement is concluded, that all chemical-weapon arsenals be turned over to civilian authorities. The military will lose control over chemical weapons. The aura of secrecy will be removed from the problem, which will make it possible to hold an international competition for the technology of destroying and recycling chemical weapons, as well as to make a general inventory of stockpiles and to modernize storage facilities. But the main thing is there will not be any problems with mutual verification.

[Vlasov] Will the military agree to give up control over such an important part of its arsenal?

[Yufit] On the whole, it too has an interest in the destruction of chemical weapons. But the military always does everything slowly, especially when it comes to weapons reductions. But the problem, after all, is not just the military. How are chemical weapons to be transported, and where will plants for the destruction of chemical substances be built?

[Vlasov] What, in your view, could Russia's approach to the solution of this problem be?

[Yufit] Chemical-weapon arsenals are located on the territory of Russia, among other places, and thus they should be destroyed here. As far as I know, the RSFSR Supreme Soviet's Committee on the Environment looks with understanding on the solution of this problem. But this question, unfortunately, has not been discussed at all in the parliament itself. Our immense secrecy results in a situation in which we ourselves do not know what is stored where. Therefore, Russia must first of all demand that the military lift the secrecy on its arsenals. That is difficult, because all the stores are located in populated regions, but nonetheless, the problem must be solved.

[Vlasov] And one last thing: How your idea of turning chemical arsenals over to civilian authorities found support?

[Yufit] No, it hasn't.

All there same, there was some response. At the conference in the Soviet Peace Committee, Maj Gen G. Yevstafyev, director of the USSR Defense Ministry's 27th Center, asked that the question of who should be responsible for the destruction of chemical weapons in the USSR not be discussed, since the president had already assigned that task to the Ministry of Defense and other interested departments.

Use of Underground Nuclear Blasts for Ecological Benefit Proposed

91WN0501A Moscow *PRIRODA* in Russian No 2, Feb 91 pp 36-42

[Article by Albert Petrovich Vasilyev, Nikolay Kornevich Prikhodko and Vadim Aleksandrovich Simonenko: "Underground Nuclear Blasts... To Improve the Ecological Situation"]

[Text] We have finally begun to realize lately how ruthless we have been in relation to nature and, consequently, to ourselves, the more so our children and grandchildren. The feeling of the inexhaustibility of the natural wealth of "our immense Motherland," in no way justified (and it looks like this hackneyed expression also worked against a careful attitude toward nature), has led to its thoughtless and rapacious destruction. And today these accumulated and carefully muffled problems have risen up before an economically exhausted society in all their urgency, a society that does not know how, or with what, to patch the countless ecological "holes" that are facing it. It is obvious that we must seek optimal environmental-protection strategies that would make it possible to have a rapid and beneficial impact with reasonable expenditures. One such opportunity—the use of underground nuclear explosions to improve the ecological situation—could seem a paradox in our times, if not even blasphemous. The positive experience that already exists in the application of this technology, and the convincing and considered arguments in its favor, nonetheless allow us to make an attempt to direct the attention of society toward it.

The discussion will concern isolating the industrial effluent discharged into the country's bodies of water, a large portion of which (about 60 percent) does not meet health-safety norms.

Surface storage ponds or "white seas," as the people call them, are widely employed in our country for the temporary storage (until the next spring floods) of industrial effluent, highly mineralized and containing toxic substances. This is perhaps the worst way of neutralizing effluent. Every such pond occupies hundreds of hectares of land. The atmosphere in the area of the ponds is polluted due to the constant evaporation of harmful substances. But the chief danger is that in virtually all cases, despite the creation of protective screens under a layer of clay or

synthetic film, seepage of industrial effluent into the ground water occurs. The contaminated area can reach 25,000 km². Cases are known of the disabling of city water systems for this reason. The elimination of this contamination of the ground water is labor-intensive and expensive. The cost of the operations to eliminate the causes and consequences of the contamination of fresh water in the area of the city of Aktyubinsk, for example, are estimated to be 30-40 million rubles.

The best solution of the problem would be the creation of waste-free technologies and the building of treatment facilities able to ensure the necessary cleanliness of the air and water. It is well known, however, that cleanliness must be paid for, and it costs more than a little—the cost of treatment is comparable to the cost of production. Such a factor as time also cannot fail to be taken into account. It is required for the development of new production technologies and treatment methods, and one cannot manage the construction of new types of production or the upgrading of old ones and their provision with the necessary structures without time expenditures, either.

The contamination of the air and water are not connected with each other, and the tasks of cleaning them can be resolved separately, at least in some areas. If we were able to halt the contamination of the water through some simple and inexpensive method for a certain period of time, say, then we could hurl all of our manpower and resources toward cleaning the air, and then be occupied with the water. The simplest method of avoiding the discharge of contaminated water from chemical production into rivers and lakes is...

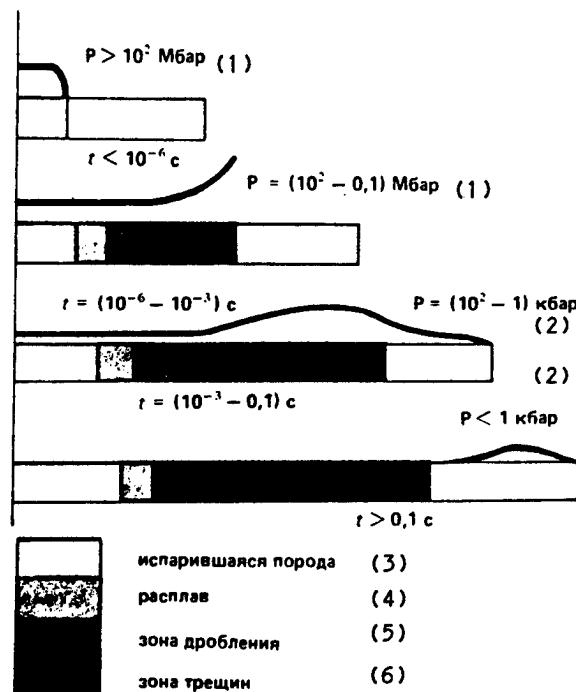
The Deep Burial of Wastes

In order for this to be safe and reliable, the fulfillment of several strict conditions is required, including the following.

1. The burial should be performed in strata that are part of stable geological formations and are reliably isolated from artesian and surface ground water.
2. These strata should have low rates of water flow, so that the wastes cannot get into other geological conditions over the course of a long time (hundreds of years) and cause the pollution of ground water there.

Deeply occurring oil and gas fields that have been worked out, as a rule, satisfy these conditions. The very fact of the prolonged existence of accumulations of petroleum confirms the security of filling these lenses with liquid wastes. Quite a large amount of oil, however, remains in a spent oil field (sometimes more than half of the initial reserves), and the pumping of wastes into them could hinder our descendants in recovering these remainders. It must also be kept in mind that a worked-out oil field is not always close to the source of the wastes, and the laying of pipelines able to combat their corrosive action is very expensive. The wells through which the wastes are pumped moreover usually have small intake capacities—just a few hundred cubic meters a day can be pumped through them, no more. Many wells would thus have to be drilled to a depth of 1.5-2.5

kilometers, which is very expensive, to bury all of the wastes of a single combine (tens of thousands of cubic meters a day). The surface of the well becomes clogged quite quickly with particles of the suspensoids contained in the wastes as they are pumped in. Whence the necessity of the preliminary treatment of the wastes to remove solid impurities and dilute them heavily with clean water. But even that, as experience shows, does not eliminate the gradual 5-10-fold reduction in the intake capacity of the wells, which requires the stoppage of a portion of them to wash out the surfaces using various solvents.



Zones of destruction near the center of an underground nuclear blast. The shock wave lessens with distance from the center of the blast. First it vaporizes the rock, then only melts it, and later just shatters it, forming cracks at great distances. The magnitude and shape of the pressure pulse (black curve) varies therein. The seismic wave finally brings the news of an explosion in a remote corner of the globe.

Key:

1. Mbar
2. kbar
3. vaporized rock
4. melt
5. shatter zone
6. crack zone

The main thing, however, is that it is virtually impossible to inject industrial effluent chemically incompatible with stratal waters through conventional wells—the sediments formed therein plug the pores in the stratum, and the well ceases to accept the effluent.

It should be noted that the intake capacity of wells drilled even comparatively close to each other can differ by tens or

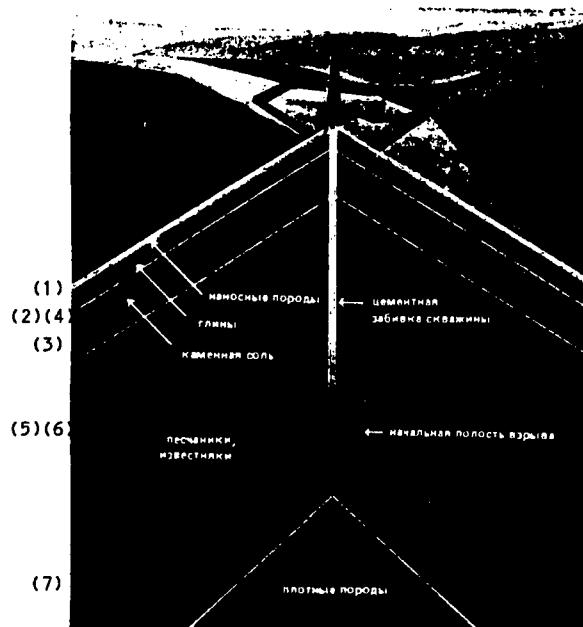
hundreds of times. A well that ends up in a zone of natural cracks can take 1,000 m³/day, at least in the first weeks of injection, while a well located right alongside, even when pumped under pressures of 100 atmospheres, can sometimes only take 10-100 m³/day. A relatively high level of intake capacity (5,000-6,000 m³/day) that is maintained for the span of many years can be ensured by a small (a few kilotons)...

Nuclear Explosion in the Well

If a explosion is executed at such a depth that it has no destructive effect on the ground surface, it is called contained. All nuclear explosions performed on the territory of our country satisfy this condition. The requirements posed toward nuclear blasts used for peaceful purposes are more strict, to wit: the destruction in the layers close to the point of the blast should not lead to the entry of radioactive by-products into ground water or onto the ground surface.

One typical feature of the processes of powerful explosions is their similarity, *i.e.* the coincidence of typical magnitudes at identical relative distances and times. The institution of the adjusted depth $h/E^{1/3}$ is thus justified, where h is usually measured in meters and the release of energy E in thousands of tons of TNT.¹ A blast at depth h , as the results of many experiments have shown, is contained if its adjusted depth $h/E^{1/3}$ is greater than 120 m/kt^{1/3}. Tests at nuclear test ranges are usually conducted at these adjusted depths. Peaceful nuclear explosions are conducted at much greater adjusted depths. A plan for the creation of a so-called "enlarged" well was proposed a long time ago,² and two commercial-test explosions conducted more than 15 years ago have confirmed that this technology is applicable even in strata that are distinguished by low permeability and are filled with highly mineralized water. What happens in the nuclear explosion? Arguments in favor of this technology could seem unfounded without an answer to this question.

First of all, a pressure of millions of atmospheres at millions of degrees in temperature develops in the nuclear charge in a millionth of a second. It is therefore not surprising that the container holding the nuclear charge and a portion of the surrounding ground is vaporized. The density of the energy initially released is so high that its transfer into the dense environment surrounding the charge occurs primarily via radiant thermal conduction, *i.e.* thanks to the mechanism operating in the hottest regions of stars. The density of the energy declines to the extent it embraces newer and newer layers of the substance and, starting from some instant, a change in the regimen of energy transfer to gas-dynamic occurs, in which a shock wave is the principal mechanism. But even then the density of the energy in the substance encompassing the movement proves to be unusually high for natural earth processes—the substance experiences shock compression to densities four-five times the initial value at the wave front. Such dense and solid substances as rock, in



A nuclear blast in a well. After the completion of drilling, a casing pipe is lowered into the well, and the cavity between it and the rock is cemented. The quality of the cementing is monitored using various geophysical methods. After lowering the nuclear device, an airtight plug is also built in the pipe, closing off access to the upper layers for the radioactive gases.

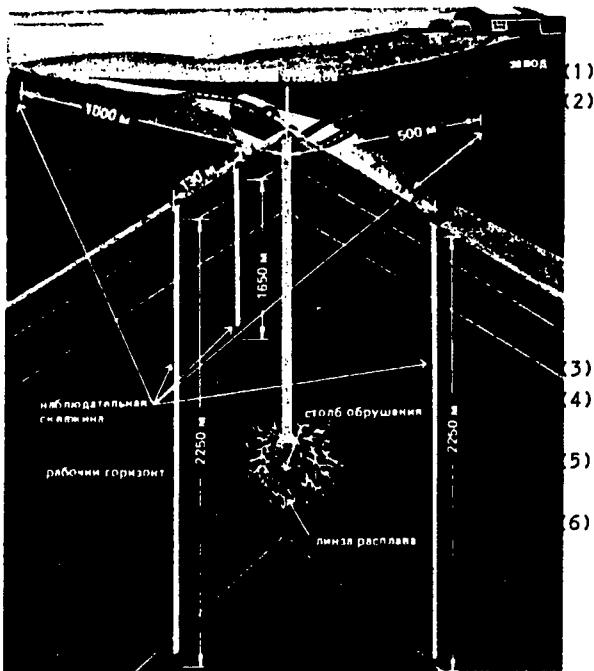
Key:

1. alluvial rock
2. clay
3. rock salt
4. cement well casing
5. sandstone, limestone
6. initial blast cavity
7. dense rock

other words, behave like liquefiable gases. The rock, experiencing the effects of such a powerful shock wave, vaporizes, melts and, at greater distances from the blast center, is crushed into sand and gravel.

Newer and newer layers of the substance are encompassed to the extent of the distance of the shock wave from the blast center, which leads to a lessening of the shock wave—its amplitude decreases (pressure and compression of the substance at the front) along with its velocity. At the instant that its velocity drops to the speed of the longitudinal waves in the surrounding rock, a so-called "elastic foreshock" appears in front of the principal shock wave, which is then transformed into a seismic wave. The shape of the shock-wave front loses its step nature and becomes flatter therein. This wave is usually called the load wave. The rock mass behind it is crushed into blocks of varying sizes, and new cracks appear while natural ones are expanded.

The gas bubble formed by the by-products of vaporization expands until its pressure is less than the lithostatic pressure of the ground. The cavity that arises as the result of



Injection of liquid wastes into the rubble chimney created by a nuclear blast. After drilling out the airtight plug, a pipe is lowered into the well through which the wastes are pumped. Particles contained in the effluent remain in the empty spaces of the blast area, while the liquids run off along the cracks under pressure. Observation wells drilled on different sides make it possible to monitor the movement of the effluent front.

Key:

1. plant
2. injection of wastes
3. observation wells
4. rubble chimney
5. working horizon
6. melt lens

The explosion has a shape close to the spherical at this time. A layer of melted rock on the order of 10 cm thick exists at its boundary that contains the gases, including radioactive ones, inside the cavity. The zone of crushed and cracked matter extends further ($10-15 \text{ m}/\text{kt}^{1/3}$ thick). There can be appreciable deviations from these scales depending on the specific properties of the rock and the rock mass overall. The formation of condensable melt mixed with the radioactive by-products of the blast in the cavity occurs in any case, thanks to which the most dangerous refractory radioactive by-products are concentrated in the melt flowing to the bottom of the cavity.

Nuclear charges of several kilotons are usually used for peaceful purposes. The radius of the formation of the cavity for them, depending on the depth of the blast and the properties of the rock, is $7-10 \text{ m}/\text{kt}^{1/3}$, while the crack zone is up to $60 \text{ m}/\text{kt}^{1/3}$. The phenomena in a nuclear blast, as has already been noted, possess a similarity—changes in the rock mass are identical at distances with identical

values of $r/E^{1/3}$. Thus, if the radius of the crushing zone is $25 \text{ m}/\text{kt}^{1/3}$, then it is equal to 25 meters in a blast of $E = 1 \text{ kt}$, and 50 meters when the blast is $E = 8$. Some deviation from this law in a contained blast can be brought about by the force of gravity and the specific features of the ground.

We have briefly sketched a picture of the mechanical processes in an explosion. But a very important question lies outside their scope that is associated in the minds of most people in nuclear blasts first of all, namely the behavior of the...

Radioactive By-Products of the Blast

The most refractory components, which include radioactive fission fragments as well, settle on the bottom of the cavity as the gases cool, forming a melt lens in which the principal portion (80-90 percent) of the radioactivity is concentrated. Its concentration could be increased even more if refractory substances that absorb various fission fragments are placed close to the container with the nuclear charge when preparing the blast. This technique has been successfully employed in practice. The thick layer of rock that flowed from the walls of the cavity and contains fewer fission fragments covers the top of the melt lens. The overall radioactivity of the blast, by the way, is not great. Whereas about one ton of uranium is burned off in the standard power unit of a nuclear reactor with an electric-power capacity of one gigawatt over a year, and about one ton of fragments is formed accordingly, just 200-600 grams of fragments are formed in the typical peaceful blast, *i.e.* thousands of times less. Some 500-700 tons of rock are melted per kiloton (and roughly 60 grams of fragments are formed therein), which facilitates the natural self-burial and strong dilution of the radioactive by-products into the vitreous mass of the melt.

An airtight cavity is also preserved after cooling in a blast in rock salt. A cave-in occurs in the cavity in most rock, sometimes in just minutes and sometimes days after the blast. Clumps of rock from the upper part of the cavity fall, covering the melt lens with a thick layer. A rubble chimney roughly four-six times the radius of the cavity is formed as a result from the rock debris with empty spaces in between. Radioactive gases that have not yet decayed (krypton and xenon) rush from the cavity through cracks. If there is a layer of plastic and non-permeable rock above the fissure zone, the radioactive gases remain in the blast zone and cannot get to either the ground water or the surface. It is under just such geological conditions that blasts for peaceful purposes are conducted.

An airtight plug is created in the well, for example using cement, after the container with the nuclear charge is lowered to the assigned depth, in order to keep the radioactive by-products of the blast from penetrating to overlying strata along the well. It is located above the future rubble chimney, and its length is from tens to hundreds of meters.

We have presented in concise form the arguments pertaining to the safety and reliability of creating cavities using a nuclear blast. It remains only to discuss the last aspect, of no little importance, of...

The Nuclear Blast and Economics

Some time after the blast (usually a few months), the well can be opened. The short-lived isotopes of the noble gases have lost their radioactivity virtually entirely by this time. The well is joined to the rubble chimney by removing the cement plug. This operation is considerably cheaper than drilling a new well into the rubble chimney. The technology for restoring the well after a blast while ensuring its airtightness was worked out in the USSR in the creation of reservoirs in rock salts.³

Wastes are injected through the restored well into the free space in the rubble chimney, and then spread through cracks along the stratum. If there is stratal water there (highly mineralized, as a rule), they are displaced from the well in the injection of wastes. Since the dimensions of the empty spaces in the rubble chimney and the cracks running from them are quite large (tens of centimeters and even meters), physically fine particles do not clog them. Concentrated wastes can thus be pumped in, which reduces the expenditure of water by tens of times.

The network of extended cracks (up to 100-200 meters from the chimney) created by the blast will without fail be joined with natural cracks. The well is thus able to take in 5,000-6,000 m³/day for many years. Let the thickness of the stratum into which the pumping is being done at a rate of 5,000 m³/day be 150 meters, its porosity 10 percent and the hypothetical time for well operation be 30 years. It is easy to estimate that over that time the wastes—whose volume will comprise more than 50 million m³—will fill a cylindrical layer of the stratum with a radius of less than 1.5 kilometers.

The possibility thus exists of reducing sharply the pollution of rivers and lakes with biologically harmful substances in many places. This method has already been confirmed in practice and can be realized quickly in the very near future. There are many places in this country with favorable geological conditions for its application. The thickness of the strata of salt and clay located at depths of 1-1.5 kilometers is reliable protection for the ground and artesian water against the danger of contamination if the blasts are carried out at depths of more than two kilometers. Surface structures, even those close to the well, prove to be undamaged in a blast of 3-5 kilotons, as does the drilling rig and all of its equipment, which usually remains over the well during the blast.

A curious case is recalled in connection with the magnified impressions of nuclear blasts. During one of the first experiments on this problem, not long before the blast the whole area, to the surprise of the physicists, was covered with large tanks of a not very new sort. After the blast its owners were very upset when they found out that they were all whole and could not be written off.

Only the wellheads remain after all of the operations at the surface, to which pipelines are run from the combines for transporting the wastes—all of the surrounding territory is suitable for its former economic uses. Since the wastes are buried compactly in the stratum, by the way, it will not be

difficult to extract them through the same well if they have to be used as a raw material in the future.

Just a few dozen tons of suspensoid particles can be held when pumping highly mineralized effluent into a conventional well, and even that is under exceptional circumstances, when the well opens up a highly permeable collector stratum with a well-developed natural system of cracks. The well created by a nuclear blast makes it possible to inject effluent containing four-five times more suspensoid particles. One such well is thus able to replace at least 10 conventional ones, if you also take into account that its capacity is three-four times greater.

It is exceedingly important that industrial effluent that is chemically incompatible with stratal water can be pumped into the "enlarged" wells. The solid residue formed in the interaction with the liquids remains in the empty spaces of the rubble chimney (many thousands of cubic meters), as the result of which a clarified liquid enters the working stratum.

Three or four wells (one of which could be a back-up) are sufficient for the burial of all the liquid wastes from a large chemical combine, allowing for the fact that lightly diluted wastes can be pumped into the rubble chimney.

The harm from the discharge of effluent into rivers and lakes, depending on their composition and the place of discharge, can be from one ruble to several dozen per cubic meter of effluent, according to the estimates of ecologists. Consequently, one well will make it possible to avoid harm of several million rubles over a year, and about 100 million rubles over the lifetime of the well. The building of a single injection well and its closure after a blast, as well as the observation wells and pumping station, costs about 10 million rubles.

Two small detonations were conducted in this country, as has already been mentioned, in order to create "enlarged" wells. More than 20 million m³ of highly mineralized effluent were pumped into one of them over 13 years, and more than 1,000 tons of solid residue was introduced into the stratum therein. More than 150,000 m³ of toxic effluent, with a large quantity of suspended particles and containing resinous substances that possess an exceptionally high ability to clog the pores of the collector stratum, were pumped into another over five years. The burial of this industrial effluent through conventional wells is virtually impossible, and there are still no reliable methods of cleaning them.

The underground burial of harmful industrial effluent at these combines has made it possible to avert possible harm to the environment of a total of about 100 million rubles up to the present time.

Special and economical small-caliber charges have been developed and used repeatedly for peaceful applications, and the choice of well diameter is determined not by the charge, but the requirements for its throughput capacity. The cost of the operations is, as a result, basically defined by the spending on well construction.

I would like to note another circumstance of no small importance. Issues of safety have particular significance for sources of highly concentrated energy. Steps have been taken in the development of nuclear charges for peaceful purposes that rule out the accidental detonation of the nuclear charge in any situation, including dropping it from an aircraft. Specific features in the configuration of the charge moreover make it possible to reduce the content of the most dangerous radioactive by-products.

We would like our note to attract the attention of various specialists, and first and foremost chemists, ecologists and economists, to the possibility of easing the fate of at least some ecologically unfavorable regions. This could be done quickly, reliably and without large expenditures.

Unique experience has been accumulated in our country in the execution of peaceful nuclear explosions. The deep structures of the earth's crust have been studied, powerful gas flares have been extinguished, the production of oil has been intensified and underground storage has been created for petroleum products using them. (The results of those operations, unfortunately, are better known abroad than here.) A technology providing for complete radiation safety at all stages of the work has been worked out and confirmed in practice over two decades. This technology includes strict requirements for the choice of location and the power of the blast, the design of the well and the nuclear device itself.

We must not lose what has been achieved. The use of the uranium and plutonium being removed from the warheads of missiles being taken out of service for peaceful explosions, by the way, would be both politically and economically advantageous. Such a device would be almost cost-free. It is, after all, both difficult and expensive to store fissionable materials—the safety measures require considerable expenditures. The destruction of a missile is simpler than a warhead. The conversion is thus advantageous from all points of view. Physicists could help with this. But only joint inquiry by geologists, chemists, design engineers, economists and ecologists should select the most important sore spots in the country where help for nature, which has suffered from the hand of man, is especially needed.

We hope that these solutions will be adopted quickly. And then the wastes of at least one chemical combine would quite quickly cease to be poured into wholly blameless rivers.

Albert Petrovich Vasilyev, candidate of physio-mathematical sciences, department chief at the All-Union Scientific-Research Institute for Technical Physics (Chelyabinsk-70). Realm of scientific interests includes nuclear physics and engineering and peaceful nuclear explosions, including their ecological and economic aspects. USSR State Prize laureate.

Nikolay Korneyevich Prikhodko, doctor of technical sciences, laboratory chief at the All-Union Design, Surveying and Scientific-Research Institute for Industrial Technology. Principal scientific interests are researching physical processes in mining using various methods of working the rock.

Vadim Aleksandrovich Simonenko, doctor of physio-mathematical sciences, professor, chief of the theoretical department of the All-Union Scientific-Research Institute of Technical Physics. Engaged in studying the physical and mechanical processes in powerful explosions and the development of theoretical and experimental methods of researching the properties of substances under extreme conditions. USSR State Prize Laureate.

Footnotes

1. One kiloton of TNT is equivalent to 10^{12} calories. The term "power" is used for explosions, especially nuclear, instead of the more precise "energy release" in special and popular literature.
2. "Atomnyye vzryvy v mirnykh tselyakh" [Nuclear Explosions for Peaceful Purposes]. Moscow, 1970.
3. Myasnikov K.V. // Peaceful Nuclear Explosions. Vienna, JAEA. 1971, pp 201-208.

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Potential Effect of Global Warming on Russian Plain Estimated

91WN0499 Moscow PRIRODA in Russian No 3, Mar 91 pp 83-88

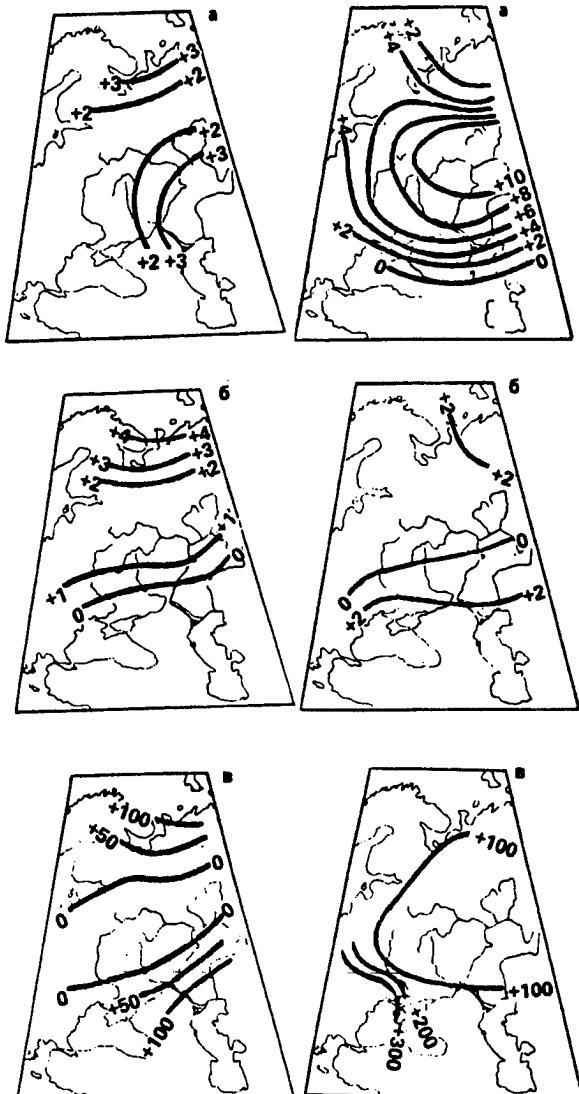
[Article by Oleg Dmitriyevich Sirotenko, Andrey Alekseyevich Velichko, Valeriy Anatolyevich Dolgiy-Trach, and Vladimir Andreyevich Klimanov: "Global Warming and the Future Agro-Climatic Resources of the Russian Plain"]

[Text] The impression that changes in the chemical composition of the atmosphere, and especially the increase in the concentration of CO_2 caused by human activity, is leading to global warming on the planet has been solidly corroborated among specialists. In the United States, for example, a group of scientists directly links the droughts of recent years in eastern regions with man-made effects on the climate. A new task arises therein at the same time—to calculate what the conditions will be for agricultural activity in these or those regions of the Earth with a warming of the climate. This work has already been performed in a number of countries. All near-term and long-range plans for the development of the economy in the USSR (including agriculture) are structured, as a rule, without a proper regard for global climatic changes.

In 1989-90 we tried to evaluate the possible effect of climate on the agro-climatic resources of the European portion of the USSR (more precisely, the Russian plain).

Models of the overall circulation of the atmosphere are often used when assessing the climate of the future. But these models, with more or less concordant forecasts of thermal conditions, provide differing assessments of the specific regional features of moisture conditions. We thus used the so-called analog method, based on paleoclimatic reconstructions.

The point is that large-scale warmings and coolings in the geological past were also connected with fluctuations in the gas content of the atmosphere, which can be judged in particular from the data of analyses of the gas content of the air over the last 150,000 years in the ice cores of Antarctica. Insofar as, in the estimates of many researchers,¹ the global temperature on the Earth will increase by roughly 1°C by the year 2000 and 2°C by the years 2020-2030, paleoclimatic reconstructions of optima for the Holocene (5,000-6,000 years ago) and the Mikula Interglacial periods (125,000 years ago), when the average global temperatures were also exactly one and two degrees Celsius higher than contemporary temperatures respectively, served as analogues. Maps of the temperature and



Deviation of the average temperatures in January (top) and July (middle), as well as the average annual total precipitation (bottom), from contemporary values at the optimum points in the Holocene (left) and Mikula Interglacial (right).

moisture conditions for those periods were constructed in the Paleogeography Laboratory of the USSR Academy of Sciences Institute of Geography. We will not dwell in detail on the technique for creating them, since PRIRODA has already discussed those maps.²

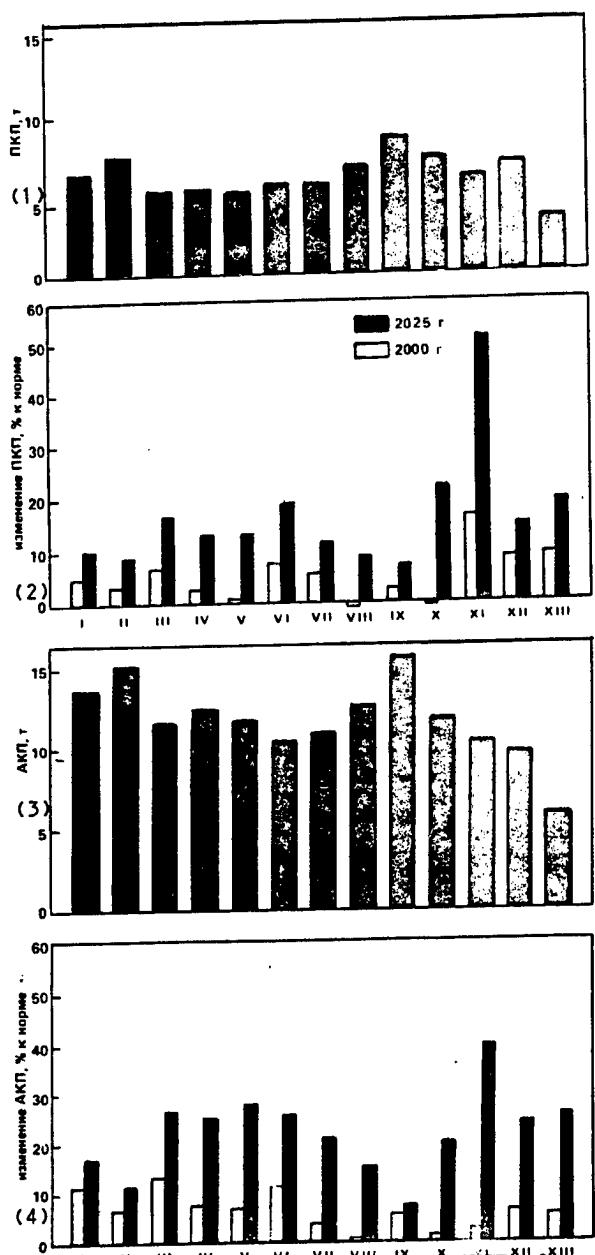
We recall only that the average temperature in January at the optimum of the Holocene was higher than contemporary ones everywhere. The greatest deviations, roughly 3°C, were observed in the northern and southeastern portions of the territory under consideration. The average temperatures in July were increased most strongly in the northern Russian plain (higher than today's by 4°C). The deviations diminished to the south, and the temperatures were close to contemporary ones at 50° latitude, and even somewhat lower further south. The average annual total precipitation at that time was greater than modern values in the north and southeast of the European portion of the USSR. Precipitation dropped by 50-100 mm more in the north and the lower Volga, and by roughly 100 mm in the Caspian region. The average total precipitation in the European portion of the USSR was close to today's or less (the difference reached 50 mm).

The average January temperatures in the Mikula Interglacial were increased the most in the east central portion of the Russian plain, where they were more than 10°C higher than modern ones. The values of the deviations decrease to the north, south and west. The average January temperatures in the Baltic region were 2-6°C higher than today's, by roughly 2°C in the northern part of the Kola Peninsula and close to modern values in the southern Crimea and the northern Caucasus.

The average July temperatures in the central part of the Russian plain were also similar to today's. The steppe zone and the northeastern regions, where July was 1-2°C warmer, were exceptions. The average annual total precipitation exceeded the modern level on almost the entire European portion of the USSR. Especially strong differences (by more than 300 mm) were noted in the southeastern regions.

The changes in the hydrothermal conditions 5,000-6,000 years ago and 125,000 years ago have a similar trend, even though they differed in the details.

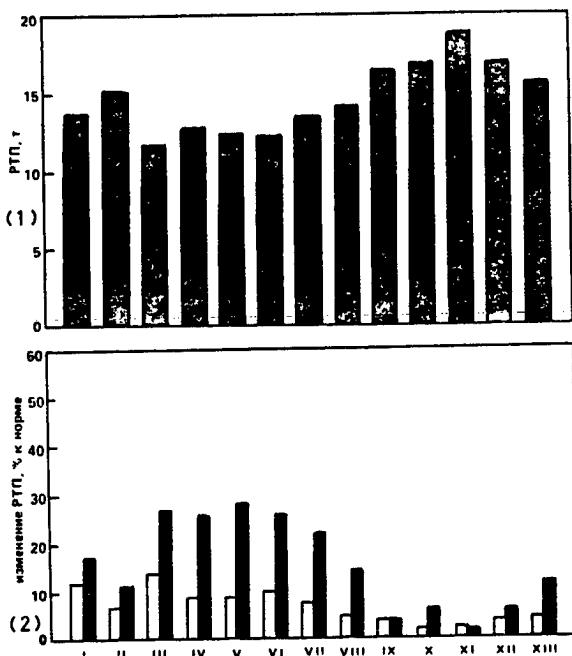
We moved from the results of the paleoclimatic reconstructions to a calculation of the possible changes in agricultural productivity corresponding to the expected changes in the climate. The most promising path for resolving such tasks is the use of models based on the photosynthetic theory of the productivity of agro-ecosystems. Many such models exist. A dynamic model for the formation of the yields of grain crops has been developed in particular at the All-Union Scientific-Research Institute of Agricultural Meteorology (VNIISKhM) that is a system of differential equations describing the balance of the biomass in an agro-ecosystem (photosynthesis, respiration and reclamation of metabolites), as well as the processes of movement and transformation of water and mineral nitrogen in the "soil-vegetation-atmosphere"



(Top two charts) Soil and climatic potential (SCP) of one hectare in a year and forecast of changes in it by the years 2000 and 2025 in the Baltics (I), Belorussia (II), northern and northwestern (III), central (IV), Volga-Vyatka (V), Urals (VI), northern Volga (VII), central chernozem (VIII), southwestern zone of the Ukraine (IX), Donetsk-Dnieper (X), southern Ukraine and Moldova (XI), northern Caucasus (XII) and southern Volga (XIII). (Bottom two charts) Agro-climatic potential (ACP) and forecast of changes in it by the years 2000 and 2025 (same designations as in upper charts).

Key:

1. SCP
2. Changes in SCP, percent of norm
3. ACP
4. changes in ACP, percent of norm



Thermal-radiation potential (TRP) and forecast of changes in it by the years 2000 and 2025

Key:

1. TRP
2. Changes in the TRP, percent of norm

system.³ The model was used for calculations of a climatic norm of the productivity of a series of grain crops for the territory of the USSR. An evaluation of the yield of any specific crop, however, does not provide a complete picture of the degree of favorability of either the climate itself or its changes for agriculture, since the same type of agro-ecosystems at moderate latitudes are not able to use all of the period of the year accessible for vegetation effectively.

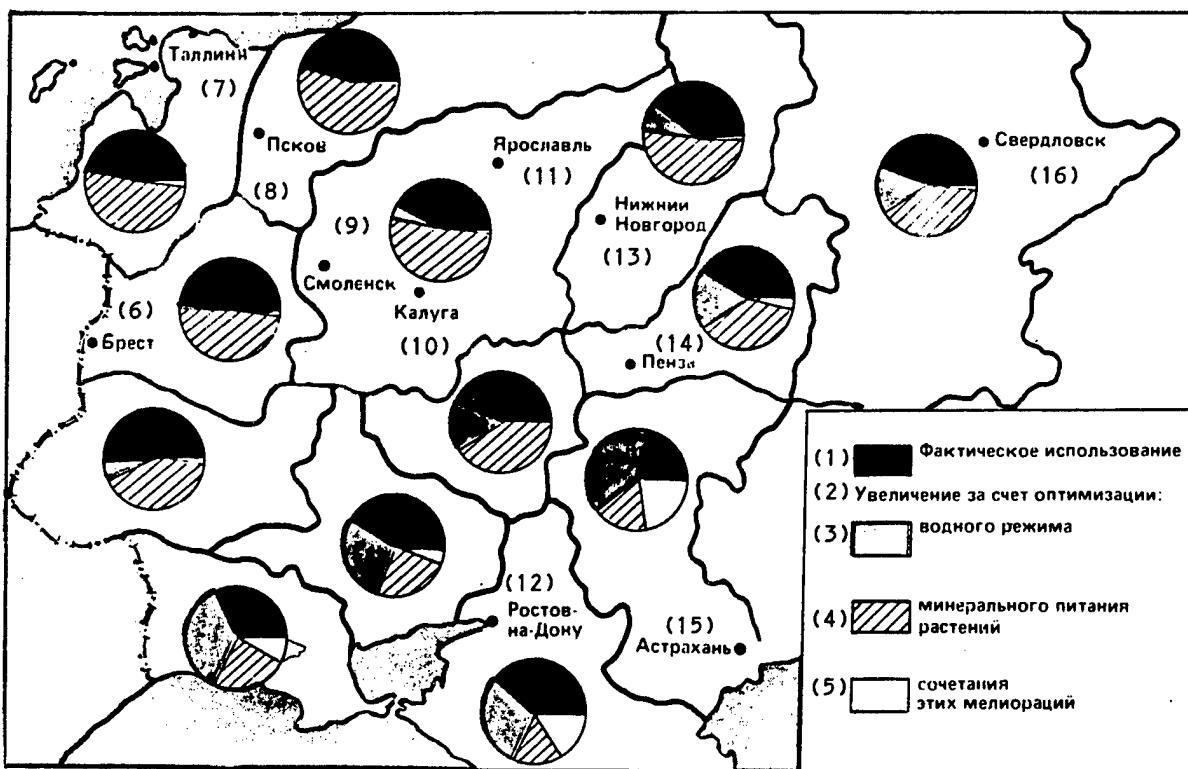
The integral dry surface biomass produced by a multiyear periodically mowed grass agro-ecosystem over an interval of the year with an average daily air temperature higher than 5°C was thus used as the potential productivity of cultivation in this work. The calculations were performed on the basis of a database created at the VNIISKhM that includes the meteorological information and set of hydrophysical and agrochemical descriptions of the soil necessary for the utilization of the dynamic models. The calculations were performed for 94 territorial entities that coincide, with a few exceptions, to the boundaries of the administrative oblasts.

A distribution of the soil-climate potential, coinciding to a certain extent with the actual yield, was obtained first, insofar as modern soil and climate conditions and accepted norms for the application of organic and mineral fertilizers were taken into account in calculating it. (The coincidence cannot be complete, however, since the losses in gathering the harvest and those due to pests and diseases, as well as violations of agro-technical methods,

were not taken into account in the modeling.) The southwestern economic region of the UkSSR (8.4 tons/hectare a year) currently possesses the greatest soil and climatic potential (dry biomass), and the lower Volga (5.8 tons/hectare) the least. Krasnodar Kray (11.5 tons/hectare) and a number of oblasts in the western Ukraine (9-10 tons/hectare) possess the best combination of soil and climatic conditions, while in the north (Kirov Oblast) and the southeast (Astrakhan) the potential drops to 4.2 and 2.2 tons/hectare respectively.

The man-made component of soil fertility—in other words, the fertilizer application rate—plays a significant

role in the formation of the soil and climatic potential. It is sufficient, to be convinced of this, to compare its values for Leningrad Oblast (6.4 tons/hectare) and the more southern Novgorod (4.9 tons/hectare) Oblast. We therefore removed this factor when calculating the agro-climatic potential, "endowing" all of the regions with an optimal quantity of nitrogen fertilizers. The distribution of the agro-climatic potential that was obtained reflects that level of productivity that would be achieved with the solution of the problem of fertilizer shortages. Agricultural productivity in many economic regions can double therein and reach 15 tons/hectare (BSSR and the southwestern



Actual utilization of soil and climatic resources and their possible transformation through the optimization of water conditions and mineral nourishment

Key:

1. Actual utilization
2. increase through optimization:
3. water conditions
4. mineral nourishment of vegetation
5. combination of these improvements

6. Brest
7. Tallinn
8. Pskov
9. Smolensk
10. Kaluga
11. Yaroslavl
12. Rostov-on-Don
13. Nizhniy Novgorod
14. Penza
15. Astrakhan
16. Sverdlovsk

UkSSR). The maximum values for productivity by oblasts are shifted from the Krasnodar Kray (13.2 tons/hectare) to Transcarpathia (17.2 tons/hectare), where the best combination of radiation and water/thermal conditions exists in the European part of the USSR.

The minimal values are preserved in Astrakhan (2.3 tons/hectare) and Kirov (10.3 tons/hectare) oblasts, insofar as the improvement in mineral nourishment does not remove the acute shortage of moisture in the south or heat in the north.

The analysis of the effects of the climatic conditions on agricultural productivity could be made more extensive by evaluating productivity with the optimization of the water conditions in the soil along with the mineral nourishment. We will call the corresponding indicator the thermal-radiation potential, insofar as the productivity of the vegetation is limited in the calculations only by the solar radiation and the temperature. The soil moisture, not limited to the production process, was modeled in calculating this potential. The distribution of the thermal-radiation potential is naturally of a latitudinal nature with a maximum point in the Crimea (20 tons/hectare) and a minimum point at the northern boundaries of commodity cultivation (about 10 tons/hectare). The values of this potential may be considered the upper limits of productivity attainable with the optimization of the water conditions and the mineral nourishment of the vegetation.

An overall picture of the effectiveness of water and chemical improvement of the soils on the territory of the European part of the country is presented in one of the figures. We will consider the Volga economic region as an example. The effectiveness of the utilization of thermal-radiation potential is very low there—19.9 percent—due to the lack of moisture and the poor soils. It can be increased to 40.9 percent through irrigation, and by just 16.4 percent through the optimization of mineral nourishment. If the water and nourishment regimens for the vegetation are improved simultaneously, however, the productivity increases another 22.8 percent. The picture is quite different in the Baltic region, where the effectiveness of the utilization of the thermal-radiation potential is considerably higher—45.6 percent—and irrigation has little effectiveness, while the optimization of mineral nourishment for the vegetation can raise productivity by 53.9 percent.

Having assessed the actual and potential possible productivity levels in cultivation with the aid of the dynamic model, we moved on to their possible transformation under the effects of global warming.

The first, and most important, conclusion is the fact that the evolution of the climate toward the conditions of the optima in the Holocene and Mikula Interglacial periods is favorable for the agriculture of the European portion of the country overall.

The maximum growth in productivity can be expected in the first case (with a rise in temperatures of 1°C) in the southern UkSSR and Moldova (17 percent), while it does not exceed nine percent in other regions.

The optimal conditions of the Mikula Interglacial are a ubiquitous increase in the annual amount of precipitation by 100-200—or even 250-300—mm (the southern UkSSR and Moldova), with a simultaneous decrease in the summer temperatures in the southern European part of the country and a rise in the north—exceedingly favorable for cultivation. Productivity rises in all economic regions, by 15 percent or more in half of them. Especially considerable growth can be expected in the Ukraine and Moldova—up to 52 percent (to 23 percent in the Donetsk-Dnieper region).

The agro-climatic and thermal-radiation potentials will increase (the former will increase by more than 20 percent in eight of 13 economic regions, and the latter in five).

The differences in the agro-climatic conditions on the Russian plain will moreover be smoothed out in both scenarios with global warming. Productivity is leveled therein for the natural ecosystems, as well as the agro-ecosystems. The area of the broadleaf vegetation zone will thus expand considerably with an increase in global temperatures of 2°C—it will extend 600-700 km more to the north in a few centuries, and forested steppe could appear in the south (in the modern steppe zone).

The modeling research we have performed on the agro-climatic resources of the Russian plain in the event of a warming of 1°C and 2°C is of a methodological nature and takes into account only the natural component of the processes of the formation of the harvest yield. We are not forecasting the actual prospects for agriculture, insofar as a model of this type can in no way take into account the political and economic factors that largely determine the future of agricultural production. It only remains to hope that not only the climate, but agriculture as well—the set of crops and cultivars, the methods of working the soil and applying chemical fertilizers, the nature and extent of reclamation operations and the like—will change for the better.

Oleg Dmitriyevich Sirotenko, doctor of physico-mathematical sciences, department head for mathematical modeling of the productivity of agro-ecosystems of the All-Union Scientific-Research Institute of Agricultural Meteorology (VNIISM) of the USSR State Committee for Hydrometeorology. Specialist in the area of modeling mass-energy exchange, the productivity of agro-ecosystems and the effects of changes in the climate on agriculture.

Andrey Alekseyevich Velichko, doctor of geographical sciences, laboratory head of evolutionary geography of the USSR Academy of Sciences Institute of Geography. Occupied with problems of the evolution of nature and questions of the interaction of man and nature. Member of the editorial board of the journal PRIRODA.

Valeriy Anatolyevich Dolgiy-Trach, candidate of geographical sciences, scientific staff member of the department for modeling the productivity of agro-ecosystems of VNIISM. Engaged in agro-meteorological aspects of modeling the production process of agricultural crops.

Vladimir Andreyevich Klimanov, candidate of geographical sciences, scientific staff member of the laboratory of evolutionary geography of the USSR Academy of Sciences Institute of Geography. Occupied with problems of changes in the climate in the Holocene and the application of mathematical methods in paleogeography.

Footnotes

1. *Antropogennyye izmeneniya klimata* [Man-Made Changes in the Climate]. Leningrad, 1987.
2. Velichko A.A., Klimanov V.A., Belyayev A.V. The Caspian and the Volga 5,500 and 125,000 Years Ago // *PRIRODA*, 1987, No. 3, pp 60-66.
3. Abashina Ye.V., Sirotenko O.D. An Applied Dynamic Model of the Formation of the Harvest for Imitative Systems of Agro-Meteorological Support for Agriculture // Works of the VNIISKhM. 1986, Issue 21, pp 13-33; Sirotenko O.D. *Matematicheskoye modelirovaniye vodno-teplovogo rezhima i produktivnosti agroekosistem* [Mathematical Modeling of the Water and Thermal Conditions and the Productivity of Agro-Ecosystems]. Leningrad, 1981.

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Railways Sector Environmental Program Outlined

91WN0506A Moscow GUDOK in Russian 5 Jun 91 p 2

[Article by R. Tsarev, doctor of economic sciences and Yu. Korobov, deputy chief of the Ministry of Railways Main Economic Administration and chief of the environmental protection section: "Will We Leave Our Descendants a Desert?"]

[Text] Recently GUDOK reported on the adoption of the railway transport ecology program for 1991-1995, developed by the Ministry of Railways and the sector's science (5/19/91). Today our authors—Doctor of Economic R. Tsarev and Yu. Korobov, deputy chief of the Ministry of Railways Main Economic Administration and chief of the environmental protection section—tell about the means of realization and economic aspects of this program.

The sector's ecology program provides for two stages of realization. The first stage consists of: Making maximal use of the available reserves for improving environmental protection which do not require significant expenditures, strengthening technological discipline, bringing environmental protection equipment into working order, and introducing means of environmental protection manufactured in the country.

In order to protect many water reservoirs against pollution with industrial wastes, provision has been made for the creation of closed systems of water application and effective methods of waste water purification, development and introduction of ecologically pure processes of internal treatment of tanks at washing-steaming stations, external and external washing of passenger cars, etc.

In order to protect the atmosphere, the ecology program plans to liquidate the basic stationary sources of pollution; to introduce progressive production processes which exclude or sharply reduce the emission of harmful substances; to use effective systems of gas purification and dust catching, as well as low toxicity types of fuel and neutralizers for main line and shunting engines.

The protection and rational use of land resources will be ensured by the restoration of lands which were disrupted in the course of building double tracking, two-way inserts, and new lines, as well as by the reinforcement of banks along the Black Sea and the Baykal. Areas have been designated for cultivation of farm crops and forest and shrubbery plantings.

The reality of fulfilling that which has been planned is secured by the economic mechanism of rational environmental application which is in effect in the country, and which is based on payments for standard and excessive dumping of pollutants into the environment, as specified by the union and republic organs. These standards regulate the economic relations in the sphere of environmental protection and the health of the country's residents. We would like to emphasize that the determination of the amounts of payment for natural resources for each enterprise relates exclusively to the competency of the republics and the local organs, and not the railroads.

Economic responsibility for pollution and irrational use of natural resources legislatively requires mandatory compensation of loss, which may significantly worsen (if appropriate environmental protection measures are not taken) the financial position of the sector and its enterprises. Thus, according to the standards in effect in the Far East, the Far Eastern Railroad may be held accountable for a sum in the amount of 20 million rubles for all types of pollution. According to the estimates of MIIT [Moscow Order of Lenin and Order of the Labor Red Banner Institute of Railroad Transport Engineers], the annual loss to the country's environment from the losses of transported cargo alone comprises 2 billion rubles.

An analysis of the level of pollution and the economic loss which it entails shows that the greatest economic losses resulting from extreme wear of the fixed capital and neglect of environmental protection work will be borne primarily by the locomotive and railroad car repair and the railroad tie impregnating plants, the locomotive and railroad car depots, the washing-steaming stations, and the civil engineering management sections. The enterprises must be prepared for the fact that ecology taxes may in the next few years greatly reduce the profits remaining within the jurisdiction of their labor collectives.

The second stage of fulfilling the program sets the task of bringing the level of emissions and dumpings into an ecological balance between industry and the environment in any region of the country. The market regulators for paid utilization of natural resources and environmental protection (through tax, credit, investment and amortization

policy) will be activated, and ecology funds will be formed on the territories of the republics, oblasts, and rayons, and at the enterprises.

It is specifically at this stage that we will be able to isolate and utilize monies from the republic and local ecology funds in order to satisfy the annually increasing need for the ecological reliability of transport means.

Another vital task is also to increase the level of ecological substantiation of adopted economic decisions. The creation of an independent scientific-consultative ecology council becomes possible in this connection. The functions of this council would include the organization of necessary scientific research; expert investigation of projects for construction of railroad and environmental protection facilities; development of ecological passports, standards and regulations for environmental application; control over the work of purification structures and introduction of waste-free and low-waste technologies, etc.

The amount of payments depends not only on the character and volumes of the pollution, but also on the location of the enterprises. Therefore, the transition to a market demands the solution of another ecological problem—what enterprises in transport must pay for the land they use? Thus, payment for use of one hectare of land comprises from 1,000 to 2,500 rubles a year throughout various regions of the country, and in the mountains it is even more—from 100,000 to a million rubles. The standard also differs significantly depending on whether the land has been allocated for the first time or whether it has been used for a number of years already. In accordance with the effective legislation, payment for land is performed by the enterprises using the land.

Along the length of a line, the land under the railroad track and along the right-of-way is not a means, but rather an object of labor. The labor collectives of these enterprises cannot fully influence the full effectiveness of application of the land area allocated to them. Therefore, from our point of view, the track lines should be exempted from the ecology tax, and the taxes to the republic and local budget, as well as to the ecology funds, must be paid by the railways.

The transition to a market requires that the railroad enterprises keep a thorough accounting of all ecological consequences. It is possible that in the near future we will come to the necessity of differentiating tariffs on dry pourable and liquid cargo judging by the indicator of their ecological characteristics, i.e., consumer ecological properties of national economic production.

The ecological price of the transported products and pollution of the environment will play a decisive role in the formulation of costs to production and transport, and accordingly also the consumer cost of the goods, i.e., their market price.

European Parliamentarians Warn of Toxic Waste Shipments

OW0107075791 Moscow *INTERFAX* in English
1030 GMT 29 Jun 91

[Following item transmitted via KYODO]

[Text] Two ships have come to Leningrad from Canada with toxic waste to be disposed of in the Leningrad region. And this is only the first such cargo to arrive. The warning came from a delegation of Europarliament's "greens" attending an international conference "Our Common Baltic Sea" being held in the city on the Neva.

The delegation invited by the Leningrad "green" movement stressed that such deals with the USSR are only too easy for western industrialists since Soviet public has no information on agreements for the disposal of ecologically dirty stuff in the USSR, while the Soviet authorities willingly make such deals in pursuit of convertible currency.

In the opinion of Europarliament's "greens", the Soviet public can do nothing at present either about the uncontrolled sales of natural resources to foreigners or ecological crimes within the country.

The conference in Leningrad discussed action for destroying the arsenal of chemical weapons now buried in the Baltic Sea which is capable of ruining a territory 10 times larger than the Baltic area.

Outbreak of Angina at 'Secret' Moscow Enterprises Probed

91WN0531A Moscow *TRUD* in Russian 18 Jun 91 p 3

[Article by I. Nevinaya: "Sickness From a Test Tube"]

[Text] Our newspaper has twice reported on a mass outbreak of illness suffered by workers at two closed enterprises situated in Krasnogvardeyskiy Rayon, Moscow. Today we inform readers about the investigation of this extraordinary occurrence. This investigation is being conducted by an officially appointed commission of the Third Main Administration (MA) of the USSR Ministry of Health, which is responsible for the health of these enterprises.

On 23 May 1991, doctors of the 11th Medical Unit turned their attention to a situation that was unusual for the beginning of summer—an outbreak of angina. This unit serves several enterprises closed to general access, which were formerly under the Ministry of Medium Machine Building, and which are now under the Ministry of Atomic Power and Industry. They were struck by the fact that the only ones who fell ill were workers behind the thick walls of two enterprises, the All-Union Scientific Research Institute of Chemical Technology and the All-Union Scientific Research Laboratory of Industrial Technology.

These institutes belong to a number of research groups that are off limits and secret. There is not so much as a sign or even a nameplate at the entrance. The security system for admittance is tightly controlled. Not only is the entrance guarded but access to each of the buildings. Many work places can be entered only with a key, and often a person at work behind one locked door can only guess what goes on behind the next locked door....Suddenly, there was this extraordinary occurrence.

The Medical Unit became genuinely alarmed. They contacted without delay the Third MA of the Ministry of Health, which soon made available a section of the local clinic in which to quarantine those who were ill. By the evening of the first day there were 12 beds occupied in this isolation ward, and the doctors continued to make house calls on those who, having been listed as ill with angina, were being treated at home. New sufferers of the illness came to the clinic by the dozens with each passing day. In a week the storm reached its peak. As of 2 July, there were 169 persons confined to the clinic, and 387 others who were under treatment on an outpatient basis.

The investigation of this occurrence was in the hands of a specially created commission, consisting of more than twenty prominent members, senior officials, expert researchers from the Ministry, and a wide array of others from various scientific research institutes. Their work was conducted along two principal lines of inquiry. It was first necessary to reveal the cause of this massive outbreak of illness by more than five hundred persons at one time, then to answer the question, How could this phenomenon occur?

There were many possible versions of what happened to be worked on. A by no means complete list of organizations who sent their specialists includes the following: the Institute of Hygiene and Occupational Illnesses; the Institute of Immunology; the All-Union Center for the Treatment of Acute Cases of Poisoning of the Moscow Scientific Research Institute of Emergency Treatment imeni N. Sklifosovskiy; the Institute of Biophysics; the All-Union Research Center of Molecular Diagnostics and Treatment; and the Institute of Virology imeni D. Ivanovskiy.

An immense amount of investigative work was done. To start with, they ruled out the suggestion of possible radioactive contamination. Investigators with dosimeters checked the areas surrounding the institutes for radioactivity, the courtyards, and the work places—on each of the floors and in the basements. A detailed chart of these measurements was drawn up. Bacteriologists, virologists, and experts on contagious diseases worked together to untangle the threads of a skein of circumstances.

They checked the operation of the dining hall. Once again their findings were negative.

Meanwhile, those who had been stricken ill could be given no convincing explanation. The "angina," as it was called, was treated with antibiotics, gargling, and inhalation. When treatment was discontinued, the temperatures of many of them rose once again, and they experienced sore throats and stiff joints with a fever. Some of the patients became chronically ill with high fevers reminiscent of long-forgotten childhood diseases. In others the symptoms of angina were not observable, but there were detectable alterations in their blood, kidneys, liver, and nervous systems.

O. Laptev, chief of the 11th Medical Unit, explained the situation by saying: "We have not quarantined the sick because of the seriousness of their condition. When a massive outbreak like this occurs, it is necessary to isolate

those who are ill to preclude the possibility of contagious infection—to place them under round-the-clock observation and try to find out the cause of the outbreak."

As the findings of the commission reveal, "modern clinical, biochemical, immunological, bacteriological, virological, serological, and toxicological, as well as functional methods" were used. Blood and urine analysis revealed an unusually high content of fluorine.

The people who were sick continued to be highly upset. They appealed to the Moscow Soviet, the Russian Federation of Independent Unions; they appeared in the newspapers and on television; and they formed a committee to protect their interests.

The situation in the institutes was no less tense than at the clinic. Closing their eyes to what they chose to regard as feigned illnesses, the administration directed its good works to its coworkers, giving them permission to use the leave-time they had accumulated (which was usually tightly regulated) and—all at once—go on vacation. The institutes emptied.

Those researchers who remained on the job, however, assisted in the investigation. In the initial period following the outbreak, a special questionnaire was prepared and distributed. Each of the 1,300 people who responded to the survey questions accounted for their time and described in detail their movements in the institutes. At the same time a check was begun on the operation of the laboratories—the chemicals each person was working with, how and where they might have been drained off or discarded, and whether the ventilation was in operation. In the process everything was thoroughly checked, even the most absurd rumors. Someone claimed to have experienced a strong odor of rotten herring—a possible sign of a group of amino acids. Someone else allegedly saw a "dense white mirage." All of this information was sifted and analyzed. Even reports emanating from the other rayons of the city were analyzed. An outbreak of "angina" was rumored in the Orekhovo-Borisovo area, and then a similar illness was noted in Butovo. The epidemiological station in Krasnogvardeyskiy Rayon assisted the commission in checking out these rumors. Incidents of illness elsewhere in the area, where they were found, proved to be idiosyncratic and in no way related to the extraordinary occurrence at the All-Union Scientific Research Institute of Chemical Technology.

And what were the findings of the commission? The most probable cause, it was found, was human inhalation of fine particles of synthetic resins containing toxic substances, including fluorine, which resulted in a massive outbreak of toxic poisoning, complicated in cases by infection (angina).

As you can see, great care was used in the investigation, but the particular substance that caused the poisoning remains unidentified. Much depends, of course, on whether or not an answer will be found to this question. Right now this question torments most of the victims (those still in the hospital and those that have returned to their homes). With regard to the aftereffects of the poisoning, fluorine is

conducted out of the human organism rather rapidly—in a matter of days. (Recall the amount of fluoride toothpaste and tablets for preventing caries, and the thought of being afraid will not enter anyone's mind.) But three weeks have passed since the start of this incident, and there are some fifty people still on the sick list. Does this mean that fluorine is not the only causal agent? Up to now there is still no answer to this question. The people are not fooled. All the applied methods of scientific investigation have proved to be insufficient to reveal the unseen poison. As a result of the commission's efforts, however, a good deal else has been revealed that provokes serious thought.

It turns out that the institute for laboratory research and experimental testing has been using more than fifteen hundred (1,500) chemical substances of various kinds. Many of these are among the most poisonous—in the first and second class of dangerous chemicals.

The ventilation is poor. At the most inopportune moment the ventilating system may unexpectedly fail.

"Unfortunately, too little thought is given to the harm caused to the human organism by various chemicals," says O. Shamov, deputy chief of the USSR Ministry of Health's medical unit and one of the leaders of the investigation. "We know that radiation is dangerous and what its consequences are. The effects of thousands of these toxic substances on every living thing, the cumulative or synergistic effects of one with another in varying combinations, and how to determine safe levels for them in the air, in water, and in products—these are all questions of the most critical kind requiring an immense amount of research. Yet we do not even have a reliable way of monitoring the presence of these chemical agents in the environment. In this respect the case of poisoning that has occurred at the Institute of Chemical Technology is not unique. Unfortunately, poisoning at industrial plants occurs much more frequently than might be supposed by the uninitiated."

Of course it is frightening to realize that we are sitting—if you will pardon the expression—on a chemical powder keg. There are, of course, a large number of enterprises in the city with a far more potent amount of chemical production than is found in a scientific research institute. Does not the secrecy surrounding so many of these enterprises act to encourage the lack of supervisory control over their activities?

The incident at the All Union Scientific Research Institute of Chemical Technology is not closed. A check on the work of the laboratory continues. Interest has arisen in what goes on at six small enterprises that have recently been shown to belong to the institute. Incidentally, four of the six, it turns out, are not even registered with the epidemiological station. Meanwhile, the case of the "industrial accident," as it is officially referred to in the findings of the commission, has been turned over to the Procurator's Office.

Scientist on Ecological Aspects of Exploiting New Diamond Find

PM2806140591 Moscow *IZVESTIYA* in Russian
24 Jun 91 Union Edition p 6

[Interview with V. Osipov, director of the USSR Academy of Sciences Geological Engineering and Geo-Ecological Center and corresponding member of the USSR Academy of Sciences, by correspondent K. Smirnov; date and place not given: "Diamonds at Lomonosov's Birthplace"]

[Text] The mass media have run a sensational story: A major diamond field has been found near Kholmogory, birthplace of the great Lomonosov. And the diamond-bearing province stretches almost as far as Moscow. *IZVESTIYA* correspondent K. Smirnov asked V. Osipov, director of the USSR Academy of Sciences Geological Engineering and Geo-Ecological Center and corresponding member of the Union Academy of Sciences, to comment on these reports.

[Osipov] Such a field has been discovered in Arkhangelsk Oblast. But Kholmogory was added for effect. Kholmogory is south of the oblast center, while the diamonds have been found 100-200 km north of it. According to forecasts, the diamond-bearing province could indeed be widely distributed along the rim of the so-called East European platform. But as yet these forecasts have only been confirmed on a small area of land.

And a further clarification: The discovery was made in the early eighties. But it is difficult to blame the press and television for reporting it as a scoop only now. All this was simply kept under wraps at the time.

Usually new diamond and gold mines are a source of joy for geologists and make a sizable contribution to the state coffers. But this considerable find also worries me, because whenever, throughout our many years of practice, the extraction of precious minerals has been involved, all environmental bans have been completely jettisoned. What if that were to happen this time too?

If accelerated exploitation of the field starts without carrying out a serious environmental study and without including the cost of environmental protection and restoration in the cost of the basic product, this part of northern Russia, so richly steeped in historical and cultural traditions, which has given Russia scientists, artists, and marvellous virtuosos, could very quickly become an environmental disaster area. The life and health of people and the environment are too high a price to pay even for diamonds. Today we are finally beginning to understand this.

And the environmental situation here is fraught with many snags for mining operations. Three mining operation options are, for example, now under examination: An open method, and each open-cut mine could extend over several square kilometers; an underground method, involving sinking shafts; and finally a combined method, initially open and then with shafts. Each has its merits but also its difficulties of application in this locale.

The conditions for storing the overburden and waste rock are extremely complex. Accidents in tailings dumps are a dreadful environmental disaster. But who will provide a technical guarantee that there won't be any? It is no wonder that the local press is exhibiting natural wariness regarding precisely those environmental problems associated with developing the field.

My viewpoint is that today it is no longer possible in principle to mine minerals, particularly precious ones, regardless of environmental consequences. The cost of environmental conservation and restoration should form part of the prime cost of exploiting our natural resources.

Status of Estonian Radioactive Waste Burial Site

*91WN0525B Tallinn VECHERNIY TALLINN
in Russian 7 May 91 p 2*

[Article by Tamara Makarova, head of the republic sanitation and epidemiological station radiation safety department: "Radioactive Waste Burial Site: Hazard Assessment"]

[Text] The republic press has written many times about the radioactive waste burial site. But as a rule, the information has been either incomplete or presented by people who are not competent. For example, in the weekly EESTI EKSPRESS No. 14 of April 12, 1991, in an article entitled: "Caution: Radioactivity," several questions were raised (to whom does the burial site belong, what danger does it pose to those around it). However, the information itself was very approximate. I would like to attempt to introduce some clarity.

The radioactive waste burial site has been functioning in Estonia since 1963. Administratively, the enterprise is subordinate to the Tallinn Specialized Automotive Transport Depot and is located in a coniferous forest 11 kilometers from the city and four kilometers from the settlement of Saku.

The area of the burial site is about one square kilometer and is surrounded by barbed wire. The radius of the protective sanitary zone is .3 kilometer. The sector in which radioactive wastes are stored directly has two storage chambers—for solid and liquid wastes. The reinforced-concrete burial chamber for solid wastes has a volume of 500 cubic meters and is divided into seven sections. At present, it is 40 percent full. The burial chamber for liquid wastes has a volume of 200 cubic meters and is lined with stainless steel. It is only 1.5 percent full—with low-radioactivity biological wastes, since the republic has virtually no liquid wastes. The area where wastes are buried has an area of 200 square meters and is surrounded by a second barbed wire fence. It also has wells that are used to monitor subsurface water radioactivity.

On driving onto the grounds of the burial site, one encounters a guardpost and sanitation checkpoint. The burial site is guarded around the clock.

Radioactive wastes in Estonia consist primarily of spent radioactive sources from gamma-ray defectoscopes, radio-isotope technical monitoring instruments, and low-radioactivity wastes from research and medical institutions. Spent sources from large gamma-ray irradiation units used in both medicine and industry have up until now been taken out of the republic by specialized enterprises in Moscow and Leningrad.

It should be pointed out that whereas in the 1960s and 1970s, gamma-ray defectoscopes primarily used radioactive sources of cesium-137, with a half-life of 30 years, in recent decades there has been a shift to sources of iridium-192, with a half-life of 74 days. This is significantly safer, since after 10 half-life periods, a radioactive substance essentially ceases to be radioactive.

The radiation situation at the radioactive waste burial site is monitored. This monitoring consists in measurements of external background gamma-ray radiation, of radioactive contamination of equipment and special transport vehicles, and of the specific radioactivity of subsurface water. The results of this monitoring are as follows: The external gamma-ray background radiation outside the burial section is essentially equal to the natural level; specialized transport vehicles and equipment have not been found to be contaminated with radioactivity; and the specific radioactivity of subsurface water has been at the natural level throughout the period of the burial site's operation. Accordingly, in assessing the radioactive situation at the burial site, one can at present consider it to be favorable and to pose no danger to the public. However, I would nonetheless like to call attention to certain problems.

Burial volumes could increase in the next few years if the specialized enterprises in Moscow and Leningrad were to stop taking spent sources from gamma- and beta-ray irradiation units out of the republic. At that time, the question would arise of the need to provide the site with its own laboratory for monitoring environmental radioactivity of the surrounding area. Until now, the specific radioactivity of subsurface water has been assessed periodically by the radiological laboratory of the republic sanitation and epidemiological station.

Secondly, we safety technicians are disturbed not so much by the burial site itself as by the problem of making sure that all radioactive sources utilized in the republic end up here following their use. The existing monitoring system cannot provide a 100 percent guarantee of this. In addition, burying radioactive wastes has cost 650 rubles in recent years, which increases the risk that radioactive sources might not be buried (VECHERNIY TALLINN, January 22, 1991).

To prevent this, burial must be fully subsidized by the state, or its cost should be included in the cost of the radioactive sources themselves. In order to step up burial monitoring, we consider it necessary to introduce in the republic an automated system to trace sources from the moment of their acquisition by an enterprise or institution to their burial at the radioactive waste burial site.

This is a task for the future, of course. But we intend to submit this proposal to the Estonian Republic government. We would also like to enlist the support of the public.

Azerbaijan Environment Chief on Caspian Conference
91WN0525A Moscow RABOCHAYA GAZETA
in Russian 14 Jun 91 p 2

[Arif Enverovich Mansurov, chairman of the Azerbaijan State Environmental Protection Committee, interviewed by RABOCHAYA TRIBUNA correspondent Ali Naibov: "Caspian Alarm"]

[Text] Baku—The first international conference on the problems facing the Caspian Sea opened in Baku yesterday.

Last summer, agencies of Azerbaijan's State Sanitation Service were forced to take an extreme and unprecedented step—to close almost all of Apsheron's beaches, which are renowned for their golden sand, velvety waves, and sun that leaves a deep bronze tan. The famous beaches of Mardakany, Buzovny, Zagulba, Bilgya, and Nardaran are half empty. Half empty, because despite the ban, there are skeptics who didn't believe the "doctors" and boldly embraced the gentle sea. Its "caresses," however, sometimes had a regrettable outcome: Bathers developed skin and allergy infections. The poisoned Caspian is taking revenge for the many years' of ecological violence done to it, and for our civic conscience, which has been in a deep lethargic sleep.

In a conversation with me, A. Mansurov, chairman of the Azerbaijan State Environmental Protection Committee, often repeated the word "alarm." As he put it, the first international conference on the Caspian Sea's problems will sound that alarm, calling the world community's attention to the sea's plight. Ecologists and officials of the country's environmental protection agencies, including those of all the republics adjacent the Caspian, are taking part in the conference, as are representatives of Iran, Turkey, the United States, UNESCO, and UNEP [United Nations Environment Program].

[Naibov] Arif Enverovich, Bismarck once said: "Only fools learn from their mistakes; intelligent people learn from the mistakes of others." If even the terrible tragedy of the Aral Sea can diplomatically be termed a mistake, the question arises: Maybe we aren't that intelligent after all, to put it mildly, if we saw the disaster confronting our neighbors and nonetheless failed to take any steps to prevent the same thing from happening in our own region?

[Mansurov] I totally agree with you: Until recently, we failed to grasp the lesson of the Aral Sea, even though it was not particularly difficult to figure out and predict the development of events in the Caspian region in accordance with the "Aral model." Although the details vary, we see the same thing in both areas: a manmade disaster resulting from the violence we have done to nature.

The Caspian is unique. It does not belong solely to the peoples inhabiting its shores. It belongs to all mankind. It would seem that such a unique body of water should be a

preserve, a giant ecological laboratory. But instead, the Caspian has been turned into a production component. The precatastrophe situation in which the sea now finds itself was preprogrammed by the fundamental principles of the command-administrative system.

Almost everywhere throughout the world, we can observe a synchronization of technical and ecological progress. There is no contradiction here: The more rationally natural resources are used, the greater the return in terms of finished output, and the lower the level of waste. And that, in turn, means less stress on the environment. In our country, unfortunately, this orderly and proven arrangement has been destroyed.

Each branch has chosen from the natural resources to be processed only "its own" components, and thrown away the rest. Most often—into the sea, as is done in Azerbaijan to this day in extracting iodine and bromine from drill water: Boron, strontium, and other rare-earth elements, whose value exceeds iodine and bromine products by many times, goes off into the sea. The same is true of common salt, which Azerbaijan imports from other republics.

Unfortunately, the area's natural resources are free of charge. So try and refrain from the temptation to exploit nature's free gifts with reckless abandon!

[Naibov] But that same temptation could confront any economic manager or businessman "over there." And that's why the state exists in the first place—to restrain the appetites of those who would grow rich at nature's expense.

[Mansurov] You will agree that it is difficult to appease those who like to avail themselves of nature's bounty when you sign a decree on environmental-protection measures with one hand, and a decree ordering faster rates of development with the other. More than 15 government resolutions and decisions have been taken with regard to protecting the Caspian Sea in the past 20 to 25 years. And what good have they done?

And now another wave of disaster has swept over us—in the most direct sense of the word. The Caspian, whose level is subject to cyclical fluctuations, is now advancing once again. It's time to sound the alarm. But instead, a fresh assault on nature is being planned: the large-scale exploitation of western Kazakhstan's high-sulfur petroleum deposits—essentially a poison for all living things.

We are still completely unable to part with our ecological self-centeredness, from an ecological short-sightedness syndrome. Yet ecosystems know no state borders. Experts maintain that dust and salt from the bottom of a dried-out Aral could even cause the mountain glaciers of the Himalayas to melt! The alarm bells of the Caspian are ringing for all of us.

[Naibov] As is apparent, discussion of the Caspian's fate has long been urgent and promises to be serious, if difficult, at the conference. What tasks associated with saving the sea do you see as the most important and most pressing?

[Mansurov] First and foremost, we must conclude treaties that will regulate, at the international level, the rights and responsibilities of the republics and states of the Caspian region with respect to preserving the sea's ecological purity. As a first step, the participants in the conference could reach agreement on joint efforts to restore the health of the Caspian ecosystem. In my view, it is necessary to establish an independent Caspian Sea fund that could serve as a source of special-purpose financing of ecological research and applied programs. It is also necessary to set up corresponding intergovernmental structures. Clearly, all fines levied for polluting the sea should be deposited in this fund.

Baku Conference Adopts Plans To Save Caspian Sea

*LD1706191691 Moscow TASS in English 1806 GMT
17 Jun 91*

[By AZERINFORM-TASS correspondents Khalil Imanov and Viktor Shulman]

[Text] Baku June 17 TASS—The first international conference on the Caspian Sea ended in Baku today after adopting a package of proposals with the aim of saving the world's largest lake.

The five-day event, attended by ecology chiefs from constituent republics and leading Soviet and foreign scholars, created a preparatory committee to organise the Supreme Caspian Council. This non-governmental body is designed to pool efforts of countries in the Caspian region in order to stabilise and improve the ecological situation.

“Cooperation at union and international level will help assess the ecosystem of the sea and the huge territory adjacent to it, to establish priority problems and mechanisms for their realisation, to coordinate national plans and to elaborate a concept of the single regional programme to save the Caspian Sea,” said Urkhan Alekperov, vice president of Azerbaijan's Academy of Sciences. “We will also lay down the legal basis of rational nature conservation and work out recommendations for further cooperation between interested states.”

Participants in the conference also asked the governments of Caspian states to create a regional foundation to save the Caspian Sea.

The conference adopted an address to UN Secretary General Perez de Cuellar, Soviet President Mikhail Gorbachev and the world community expressing hope that the United Nations, international ecological societies and movements will render assistance to the organisation of the foundation to save the Caspian Sea.

Greens in Armenia Demand Access to Yerevan Chemical Works

*OW2406111491 Moscow INTERFAX in English
1230 GMT 22 Jun 91*

[Following item transmitted via KYODO]

[Text] The Greens in Armenia have accused the Yerevan chemical association Nairit of polluting the atmosphere

with poisonous matter. On Friday, their leader Akop Sanasaryan said poisonous chloric gases had for several days running been discharged into the air by the association's electrolysis plant, for one. He said Green activists had been barred from the plant's premises and received numerous verbal threats. According to Mr. Sanasaryan, the performance of Nairit's hazardous production units is actually uncontrolled.

The production association Nairit, the Soviet Union's sole producer of a whole number of chemical substances, was closed under the Greens' pressure at the end of 1989, but resumed work earlier this year.

Claiming support from Yerevan's meteorological service, the Nairit administration officially refuted the Greens' charges and denied that there had been any hazardous discharges at all.

When IF's [INTERFAX] reporter turned to the meteo-service [as received] for confirmation, he was told that several chlorine discharges from Nairit's premises had actually been registered, although “the gas concentration did not exceed the permissible figure.”

South Urals Miners Protest Closure

*LD1906043791 Moscow TASS in English 1746 GMT
18 Jun 91*

[By TASS correspondent Yevgeniy Tkachenko]

[Text] Chelyabinsk June 18 TASS—Ninety miners led by mine chief Boris Bespalko have completed their first day on a hunger strike in the 850 meter pit in the town of Karabash in south Urals.

The strikers, who said they would not leave the mine until their demands were met, are protesting against the decision to close down the mine as an ecologically harmful enterprise.

The situation arose owing to the irresponsibility of the federal government and the USSR Metallurgy Ministry, the strikers said.

City authorities went down the pit on Monday to try and talk the strikers to leave the mine and go to the surface to discuss ways out of the difficult situation.

Six years ago, the Soviet Government adopted a resolution ordering the reconstruction of the Karabash copper-smelting plant, notorious for polluting the environment with its effluent and discharges. It was to become an ecologically clean enterprise at the expense of subsidies from the ministry and the government. A profit-making ore-enriching factory and smelters were shut down last year but no money has been received with which to start the reconstruction.

As a result the enterprise went bankrupt. The number of workers was cut by nearly one-third and two thousand people had to look for new jobs in other cities of the Urals and even Siberia.

Miners have not received any wages since May. The ore-extracting mine is on the verge of closure as the enterprise needs no ore in the circumstances.

"No arguments have helped," the regional executive committee's Deputy Chairman Aleksandr Kaunov said. "The striking miners demand that Soviet Metallurgy Minister Oleg Soskovets go down to meet them. A urgent telegram has been sent to the minister. We are worried about the state of the strikers' health which is endangered as sulphur is burning on one of the mine's floors and water used to accumulate in the mine even when its work pace was normal".

The leaders of the Chelyabinsk regional executive committee have sent an urgent telegram to Soviet Prime Minister Valentin Pavlov, asking for a prompt 16-million ruble subsidy to Karabash.

Rector on New International Ecological Academy in Alma-Ata

91WN0503A Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 13 Apr 91 p 4

[Interview with Professor Marat Makhmedovich Telemtayev, rector of the Ecology Academy, by L. Vayzman: "The Phenomenon of Large Systems; in Alma-Ata the World's First International Ecological Academy, InterEkolA, Has Been Established"]

[Text] This institution of higher learning is confronted with the task of training highly skilled specialists to protect the environment and for rational use of nature, for conducting fundamental and applied research as well as for organizing its own intellectual base.

In other words, from now on the broad public can rely on not only the directives of street demonstrations and the conclusions of the "fronts." Ecological problems are being put on a very serious scientific base.

Today KAZAKHSTANSKAYA PRAVDA is publishing an interview by its correspondent with the first rector of the first academy, Professor Marat Telemtayev.

[Vayzman] There is the old truth that the times dictate style. In this context, Marat Makhmedovich [Telemtayev], how much will the establishing of yet another institution of higher learning in Kazakhstan cost the taxpayers? There certainly are problems of ecology and our ecological situation is most tense. But all the same from whose pocket will come the clearly numerous millions?

[Telemtayev] You can calm the taxpayer down as we do not intend to invade his pocket. Nor will the academy make any claim against the state budget. We must learn to fend for ourselves. And we must earn as much as is needed to put things on a modern technical and economic base.

The issue is that our institution of learning will have a commercial character. That is, it will introduce the principle of paid instruction adopted throughout the entire civilized world. I do not see in this any retreats from our social victories....

But at the same time, since I am pragmatic about this, I see a different problem. Over the decades our institutions of learning have not worked for a specific client, rather creating a "general" educational system. They turned out specialists. They were merely certain abstract specialists. On the one hand, these were very essential and, on the other, they were not essential to anyone. Certainly, no one ordered them and did not assume any responsibility for them. And the student, if a very good student, satisfied his curiosity at state expense.

Such an organization of education at present is simply purposeless. Under the conditions of a total deficit of specialists, when we needed simply literate workers who had been trained at least a bit in one or another area, such an approach was completely justified. But now there is a completely different situation. We don't need people "in general," but rather persons who possess profound knowledge in a very specific sphere. Of course, possessing a high level of culture and profoundly erudite.

We intend to train ecologists for the very specific interests of the client. If he needs a highly qualified specialist in the ecology of water resources, then the specialist will be completely, I would say exhaustively, trained for this specialty, even if he was the only one.

Can you feel the difference in comparison with an ordinary VUZ [higher educational institution]? The training of a single specialist would cost 30,000-60,000 rubles. No budget could tolerate such a load. For this reason, we will organize our entire economy on a commercial basis. The state actually has no money. But there is money among the enterprises which more and more need ecological specialists of a world class. And of course these cost a lot.

Incidentally, all of this is in no way an innovation. Paid instruction has been introduced at the Dzhambul Hydro-meliorative Institute, the Pavlodar Industrial Institute and at the Kazan University as well as certain other VUZes in the nation. In no instance can we go beyond reasonable limits or all the more make a certain "business" out of education. But the training of ecological specialists should be on the highest level. We have set this task for ourselves without any concessions for the traditional "difficulties" or other circumstances. If, for example, it turns out that somewhere there is an expert who has investigated a specific aspect of the problem to the very bottom and has mastered this as no one else, we will find an opportunity to invite him to us. And this can be done in different ways, for a certain permanent post or for giving a special lecture series. And it should make no difference from where the person comes, from Novocherkassk, Japan, Kazan or Paris. In this regard in economic terms we are dependent solely on ourselves. But, you will agree, there is a paradox here as with the enormous intellectual potential which has accumulated in our nation and which is largely concentrated in the VUZes, we have our hand out as, having learned a great deal and being capable of much, we have not learned to earn enough to maintain our institution of learning.

All of this is elementary as if there is demand there should also be supply. A completely healthy exchange. But this for us initially was greatly distorted and at a certain stage we did not immediately realize that the stage of a total deficit was over and it was time to move on to a qualitatively different level in the organization of education. For this reason, in the conventional view we are seen more as parasites on state support than the merchants of material goods. In actuality, that is not the case at all. It is merely a question of being able to materialize an idea. You will agree that all the same this is nonsense when science is incapable of supporting itself. We must not take millions from the lean state budget but rather create an intellectual product worth billions for it.

[Vayzman] I would like to know how this can be done.... The economy of InterEkolA is based upon commercial principles and there are no particular problems here for if a metallurgical or a chemical production combine wants to have a world-class ecologist, then let it pay for his training, otherwise it will lose more in penalties. That is, something is taken from one pocket and put in another. But does this mean "materialize"? In nature nothing is added from such manipulations....

[Telemtayev] You are not completely right. If up to a certain moment one person has known something, after an exchange of the information many know it. Sometimes very many. In nature, as you say, the most different things appear from such "manipulations." What we are engaged in is another opportunity for turning over financial resources. What are assets per se? By themselves they do not mean anything. I mean the mere fact of their being there or not.... The assets must be put into circulation and forced to interact in order that as a result something material arises.

If by turning over the obtained money we provide for the interaction of the instructor with the student, then a completely new product, an information product, arises. In other words, a specialist is born who has perfectly mastered the entire essential "set" of knowledge. And this is a powerful tool in modern production.

What I mean is this. In a desire to make as many turnovers of financial assets as possible, what we are doing is one of these but repeating in a multiplicity. Involving major scientists in the undertaking, we will instruct people, creating new directions in production activity. The specialists trained by us will use the obtained knowledge in carrying out ecological programs, in contributing to ever-new opportunities for turning over the financial resources. Here lies the root of many problems. In any economy, everything should circulate and in the process of such "whirling" new commodities are created. Hence it is not a matter of the amount of funds, it is not one of moving them from pocket to pocket.

Let me point out, incidentally, that if it were a question of earning money generally, we could do this differently. For example, we would establish a cooperative of programmers operating in the area of information sciences. We would have a certain classroom and the product would sell like

hotcakes. Without any problem we would have enough for living and a little more. But we are setting to work on a matter the results of which will determine the future and the fate of generations. I am saying this to you without any hidden motives. Because I left a completely comfortable university chair, I moved here to the Academy where all of us can scarcely expect a calm life.

[Vayzman] Are you an idealist?

[Telemtayev] I have already pointed out that I am a strict pragmatist. At one time I completed the Novosibirsk Electrical Engineering Institute, I worked at a plant and then in a polytechnical institute. I defended both dissertations in Leningrad. In the area of cybernetics and information theory. This is a concrete science far removed from "idealism," but very close to the ideal by which I understand our universe, the very act of the creation of nature.

The subject of my scientific interests is control of so-called Large Systems in which one could put, for an example, water, arid, the biosphere, neosphere, social and so forth.

This requires profound analysis from the standpoint of systems analysis. I have made such an attempt, to create a model which would make it possible to describe Large Systems with the aid of several languages, in other words, from several viewpoints at once.

There is no need for us to go back to very distant times as history is so subjective that at present there is scarcely any researcher who cannot propose his own variation for reading it. Let us take the quite recent years. Why have things not gone well with perestroika? One thing goes wrong and then another, and in society there is a growing nervousness and disappointment in the proclaimed ideals. Why? Because the solving of the problems of the Large System—in the given instance the social system—cannot be done partially. A part cannot be greater than the whole and the solution to the problem must be approached comprehensively and consistently. But how is it possible, please tell me, to view the social life of man in isolation from the water resource situations, the soil and atmosphere?

Most importantly, let us try to understand once and for all that Large Systems have their own patterns of existence and they include a definite and unconditional passage of time. We would be very pleased if the most urgent task for society—as the situation demands—could be solved in two years. But decades will be needed to find the interaction within and outside the Systems. In encountering the growing contradictions, we cannot understand that we simply are unable to resolve them more rapidly than is dictated by objective circumstances.

An elementary example in illustration.

A motor vehicle which weighs five tons and travels at a speed of 90 km an hour cannot be turned instantly to the right or left, let alone thrown into reverse. Definite inertia operates in any motion. But the motor vehicle—road system consists of just two elements. But Large Systems,

including economic ones, are made up of tens of thousands. And with their own time, with their own internal patterns of existence.

Can all of this be turned all at once?

It cannot.

We are dominated by a revolutionary consciousness which has been established over more than one generation. The aim is more than noble, that is, for the first time to create for living man an existence worthy of him. Hence the motto of perestroika, a revolution in the revolution. We are endeavoring more quickly, in a single leap, to emerge from the socioeconomic crisis which we ourselves have organized. But we in no way can realize that the Large Systems—due to their very nature and inner logic—do not respond to our controlling efforts immediately. We can fuss as much as we like over the problem, as we are doing at present, and fall into a depression after our expected disappointments, but real changes will come about only after the accumulation of an entire total of qualities and which are adequate to our efforts.

Here certainly we must seek out an understanding of the very nexus of things. Certainly our nation has enormous natural resources and its intellectual base is strong. We live a life which is not worthy of ourselves. Albeit late, we must set out to assimilate the laws of evolution and slowly make headway rather than remaining in place jumping up and down. Remember that just six or seven years ago it was said on the state level that in 1989 computer production would fully satisfy all the needs of the USSR national economy. Or we must stop talking about a rise in labor productivity by so many percent and rather set the task of increasing it by a number of fold. And even before on a broader scale it was said that the current generation of Soviet people would live under communism....

We must not as fiercely as we do now subject ourselves to social masochism which has long since gone beyond the acceptable level of constructive self-criticism and has evolved into an ordinary, senseless mocking of ourselves. We must understand the logic of Large Systems and correlate our desires with our possibilities.

[Vaydman] Research on the phenomenon of the Systems has brought you to ecology? But why precisely here? Your analysis of the social System should be of particular interest to the sociologists, where at present philosophers are dominant and not the "systems engineers" involved with precise sciences; or pragmatists who are inclined to calculate more than write.

[Telemtayev] If you give any importance to the logic of my argument, you cannot help but understand that any move in the mind or a practical action of a person is motivated not by any one fact but rather by a total of the most diverse factors. Precisely this led me—please note—to professional ecology in contrast to the amateur movement. Both are extremely close, however on different qualitative levels, like an amateur circle and an ordinary, normal theater....

Ecology at present is of the same serious structure as any other sector of the national economy. It is essential—and do this energetically—to develop its industry and establish a system of ecological education and an ecological science.

At present, all of this is merely embryonic or does not exist at all. It is scattered over the various sectors and exists under the umbrella of something else.

For example, we must take up the treating of waste water as we cannot go on like this any longer. But there are no enterprises, in any event, there are virtually none which on the necessary scale for our republic become involved in producing treatment equipment. Why? There is not the corresponding industrial infrastructure and ecological industry. Let us take some abstract chemical combine. Since time immemorial, it "ideally" has been involved in treating its wastes. But not so professionally as in basic production. Because this is the concern not of ecologists, not of professionals. They simply as yet do not exist. Hence, one after another, the grievous ecological disasters which we must pay dearly to eliminate their consequences.

Education and science have a subordinate character and they are, as it were, incorporations in the sectors of the national economic complex. But also more often merely because it is considered "indecent" to overlook ecology.

That is, in all regards the foundation. And where is this? In the gigantic Large System called Nature. Here we must put things on a professional basis if we wish to survive.

On a professional one and not an emotional one.

However, let me make myself clear immediately.

From my viewpoint, we will have ecology specifically although there is certainly nothing wrong in demonstrations or in movements such as the Green Fronts. This is also a real undertaking if it is correctly organized. Let us put it this way: the people who are seriously concerned by the deteriorating ecological situation, in a form accessible to them explain their attitude to the local authorities and economic leaders. This is also a means of expressing public opinion.

That is, the street demonstrations, parades, assemblies and meetings—all of this certainly can be and even should be. Regardless of the fact that here there is much that is superficial and imprecise in the sense of posing the problems but we are taking the first steps in this direction and it is no wonder that we fall into "heresy."

All the same, professionalism should stand in the forefront always, in any undertaking. No parade, no demonstration is capable of resolving a specific scientific problem. Particularly in ecology where, let me repeat, we have not even established a foundation. Someone must make a start....

[Vaydman] Is this an idea out of the blue?

[Telemtayev] You mean from whence more often meteorites and fragments of spacecraft fall than do ideas as these are forced into real life by the demands of social life....

The idea of laying a foundation for ecological education came about after Anatoliy Alekseyevich Denisov, a USSR

people's deputy and well-known specialist in the area of Large Systems and I endeavored to analyze how this question could be raised at all.

And we arrived at completely specific conclusions.

The state, it turns out, even now is spending very large amounts on ecological education. This was very similar to how these problems were resolved, for example, in information science when the need arose for total computer contact.

With all the meagerness of our budget it turns out that a good deal of money is provided to be distributed between the VUZes. But this money is distributed in an unique manner. Of course, the staffs are formed and some equipment is acquired. But the basic portion is spent "at the discretion of the rector," the prorector and the most influential head of a chair or a dean. As a result, the money dribbles through the entire body of the educational system without resolving the general question. Somewhere a roof is leaking, somewhere a chair is required but there is nothing to support it with.

A typical picture. Ecology is being studied in two-score VUZes in the nation including universities, polytechnical, construction, hydromeliorative, agricultural and pedagogical institutes.

But there the roofs are also leaking.

And these are fixed using funds provided for ecology....

For this reason Prof Denisov and I made the following decision.

It is essential to create a firm which is self-managed and covers its costs and which is specifically concerned with precisely an ecological education.

Our International Ecological Academy has become such a firm.

I have already mentioned that in almost two-score of our VUZes this discipline is being studied in one way or another. And it is a very good thing that this is the case. But practice has shown that we will do little in following such a path. In the future, ecology cannot remain under the technological specialties. This should be a separate block of disciplines for training professionals capable of working in all spheres of the national economic complex. Such a task has been drawn up by the Subcommittee for Ecological Education under the USSR Supreme Soviet and it is the assignment of this subcommittee which we are now carrying out, that is, to train the highest class engineers for the entire block of nature conservation specialties. For example, for geology, for agricultural production, metallurgical or chemical industries. We will teach the students to model ecological systems and the ability to resolve arising situations in each concrete production area. If we do not do this, ecology as before will remain on the sidelines and the problems related to it in the same manner. The way out, in my view, is one: to develop the intellectual base and train broad specialists while maintaining their high class.

[Vayzman] However, there is such a question, professor. Today's industrialists have absolutely subordinated ecology to themselves and wherever you look in nature there is complete discord. We have come to our senses just in time. But are we not now "designing" the directly opposite situation, when ecology subordinates production to itself? This is happening more and more frequently. Precisely here lies the essence of the contradictions between local economic power and the Green Movement and this has led to very acute clashes.

[Telemtayev] In such antagonisms there is rather a large amount of the speculative and distorted views in carrying out ecological policy. Very many people understand the Green Movement as a mere tribute to fashion. This is how we have been taught, to attack full force either one thing or the other, and for us it is not so easy to get rid of such an ideology. Paradoxically, we do not treat the organism but rather are fighting against diseases, and individual ones, and each time we find justification for such a policy in that there are not enough resources. We have one-sixth of the world's land mass and still not enough.

However, about fashion.

When it becomes "prevailing," when some political dividends can be earned from it, then a noisy but completely ineffectual act. What is the issue here? According to the logic of Large Systems, the ecological problem is the ability to live correctly in interacting with nature. Then everything is in its place. A movement politicized in the extreme ceases to be the fashion and becomes a normal component of human activity.

If only this is done according to a strict science, without any speculation....

Man has always plundered nature. In all times. Because man is capable of living off of nature. No matter how we presently idealize our ancient predecessor or extol his harmonious relations with the "environment," he has left us a heritage of both the Gobi and the Sahara, as well as much else just as we have left our heirs Chernobyl, the Aral area and Balkhash.

The difficulty of our relations with the environment in which we live is not a matter of not touching it.

Everything is much more desperate.

The time has arrived when the System created by man in terms of its power has become commensurable with Nature. He is already capable of "reworking" it. If he does not change his mind and find an approach for the interaction between the two Large Systems. Here it would be a profound confusion to feel that man could invent something in order "not to touch" nature, something like a waste-free production method.

The most harmful thing is to foster illusions in oneself.

We will not be able to maintain the nature which we found in coming into this world. Nature also is alive and evolves according to its own laws, according to the inner logic of Large Systems. Man must understand all of this and prepare himself gradually to create a new environment. A

widely organized ecological education can mark the beginning to such thinking. Including our InterEkolA.

[Vayzman] Undoubtedly, in our times true professionalism should stand in the forefront. However, I have a concern here. A self-respecting nomadic Kazakh who has the run of enormous territories would never allow himself to deal barbarously with that land on which he has lived for the millennia and which he has been able to protect. Alas, at present, only the memory remains of this former husbandry. The Kazakh would not establish his cattle or sheep pen on the bank of a river in order to be "closer to the water," and he would not employ the "progressive method of hydraulic monitors...."

[Telemtayev] It has turned out that for us true professionalism has not become the synonym of true morality. This still must be instilled for a long time to come, it must be turned into a permanent stereotype in our conscience, even into a faith, if you wish, which one cannot reckon by reason. Ecology, as a discipline, must be taught in the VUZes and schools and we must establish ecological high schools. Morality cannot be replaced by a sum of knowledge. This is how I perceive the task of our Academy. Ecological ethics, in my view, should become one of the leading disciplines in it, like social ecology.

At the same time, I would put forward the following seditious notion. There is a more delicate, a more complicated mechanism for obtaining knowledge than the purely scientific methods of forming this. The peoples have collected information on the world about them piecemeal in order to hand this on to the coming generation and this has actually been turned into an unique religion, when one must not spit in a well and an oath over bread was one of the most emotional.

Such ideas reached mankind not out of science. The experience of generations, the enormous social experience of the peoples is just as valuable as scientific knowledge.

[Vayzman] A question which cannot be left unexplained: Why the InterEkolA, that is, why the International Ecological Academy? Why not, for example, one of Kazakhstan! Or even simpler, an ecological academy? Forgive me, professor, was it...ambition?

[Telemtayev] Don't worry, I have already heard this. As we stated at the outset, it is actually a question of establishing the world's first academy of global ecological problems. The Chernobyl or Aral disaster has struck not only the Ukraine, Russia, Belorussia or Kazakhstan, Turkmenia or Uzbekistan. Saddam Hussein set the oil fields afire and all mankind will suffer for this. The state frontier is a political category but not an ecological one. The problem is the same for all and we will not be able to sit out the approaching disaster isolated in our national quarters. There are different cabins but the ship is the same....

The status of an international organization will provide us with an opportunity to collaborate actively with all ecologists of the world. An extensive exchange of students, teachers, researchers and scientific information is simply essential. An agreement has already been reached that in

Prague, on the basis of the training center at the so-called Ecological Division (that is, Movement as this has no bearing on the army) an affiliate of our InterEkolA will be established. Upon the initiative of the same association, analogous institutions will arise in other European countries. The idea has also evoked interest in the United States.

Moreover, our international status will make it possible to send talented researchers for foreign graduate students and doctoral studies, we must be concerned for the coming generation and work for the integration of the intellectual base.

As you can see, all of this is rather far from ambition.

The forms should correspond to the content or vice versa.

In the highly developed countries of Europe and America, in recent decades it has been possible to resolve numerous ecological problems, having anticipated the approaching crisis. We are at present approximately in the same situation which they found themselves at one time. It is merely being stupid to only learn from our own mistakes.

[Vayzman] Would you like your children to be educated at InterEkolA?

[Telemtayev] They are already adults. But my grandchildren, yes I would like that a lot. And I am ready to pay for this.

Better Regional Cooperation Urged To Improve Amu Darya

91WN0507B Tashkent *PRAVDA VOSTOKA* in Russian
24 Apr 91 p 3

[Article by I. Kalandarov, candidate of technical sciences and deputy chief of Amu Darya Basin Association (Khorezm Oblast): "The Troubled Waters of the Amu Darya; Time To Take Action in the Cis-Aral Zone"]

[Text] Specialists already knew around 30 years ago that all of the runoff of the Amu Darya would soon be used for irrigation. This is when the decision was made to recycle the ground water. All irrigation and reclamation projects were planned and carried out with the stipulation that the water in drains and collecting mains would be dumped back in the river to replenish it. This idea was portrayed as an achievement of scientific thinking.

Now we are reaping its bitter harvest: Every part of the Amu Darya is polluted. Industrial and household sewage was added to the effluent in drains and collecting mains. The lower reaches of the river—taking in all of Karakalpakstan and Khorezm and Tashauz Oblasts—began receiving not only less water, but also water of poorer quality.

The mineral content even in the upper reaches of the Amu Darya exceeds the permissible limits for drinking water. Organic pollutants, metal, pesticides, petroleum products, and phenols have already been discovered near Termez, according to the data of the Uzbek Hydrometeorology Administration, and frequently in quantities considerably

in excess of the permissible maximum content. Sometimes the water in the cis-Aral zone is unsuitable not only for drinking, but even for irrigation.

The water in collecting mains and household sewage from Kashka-Darya and Chardzhou Oblasts are dumped into the river in quantities totaling around 9 cubic kilometers a year, which increases the overall mineral content of the river water by 1.6-fold or 1.7-fold and increases the content of certain salts several times over. Another half a billion cubic meters enters the river below the Tuyamuyun hydrosystem and seriously diminishes the quality of river water in the northern rayons and cities of Karakalpakstan and Tashauz Oblast.

Water management organizations in Khorezm Oblast and Karakalpakstan now have draft resolutions in their possession to stop the dumping of water in collecting mains into the river, but this has been delayed by the limited funds for capital investment. Priority should be assigned to the stepped-up construction of the trans-Amu Darya right-bank collecting main stipulated in the plans, because it will stop the dumping of more than 4 billion cubic meters of polluted sewage in the middle reaches of the river.

Many quicker and cheaper ways of carrying out this project have been proposed in recent years. In particular, the Ministry of Water Management and State Committee for Environmental Protection of Uzbekistan submitted a plan to the republic Cabinet of Ministers for consideration which would envisage the diversion of the water from the trans-Amu Darya collecting main, even before the completion of construction, to the Ayakagitma, Medami, Dengizkul, and Kattashor basins and the use of part of this water to cultivate sandy desert soils for grain farming, and also for fishing and other purposes, with the aid of domestic and foreign experience.

Specific solutions have also been proposed in Turkmenia, but no action has been taken on them yet: After all, they require careful preparations. The reduction of river flow by more than 4 cubic kilometers will change the operating conditions of river and internal reservoirs, disrupt the years-old hydrological balance in the river, and affect the water supply of adjacent areas. For this reason, the appropriate investigations must be conducted in advance, mainly with a view to defining new procedures for the distribution of water of higher quality but in smaller quantities. It will be important to reduce the amount of water diverted from the river, use the water efficiently, improve watering techniques, arrange for the comprehensive remodeling of sprinkler systems, institute progressive forms of agricultural irrigation, and take other measures to conserve water. They will require sizable expenditures.

Unfortunately, the decentralization of the union land reclamation program, the disruption of cooperative ties and relations in the branch, and the reduction of capital investments have effectively countermanded water conservation measures in our republic. The resolution of this problem will require coordinated efforts by all of the republics through which the Amu Darya flows.

The life of the entire region of Central Asia and Kazakhstan depends on the ecological state of the Amu Darya and Syr Darya basins. In the past, and even now, each republic and oblast has used the protected zones and the water of these rivers in its own interest. We believe that the protected zones of the Amu Darya and Syr Darya, from the main tributaries to the Aral Sea, should be declared interrepublic zones and placed under the jurisdiction of special organizations. Their protection should be organized in the common interest. This will require decisions on legal and organizational aspects of management and the institution of economic and administrative penalties for organizations and officials violating environmental protection and conservation laws.

When the Amu Darya and Syr Darya basin associations were established, they were clearly assigned an inadequate role in the interrepublic and intersectorial distribution of water and management of water resources. This is why the section pertaining to the Aral Sea in the decree of the USSR Supreme Soviet of 4 March 1991: "On Immediate Measures for the Ecological Recovery of the Country" says that these associations should have a higher status. We still have a long way to go, however, before the situation can be called normal. We still cannot, for example, establish reasonable water diversion regulations for the Karakum Canal and Tuyamuyun Reservoir in the interest of different republics. The successful completion of this task will require closer cooperation by the basin associations and republic agencies.

Dzhambul Morbidity, Mortality Rates Linked to Chemical Pollution

91WN0507A Alma-Ata LENINSKAYA SMENA
in Russian 13 Apr 91 p 1

[Article by LENINSKAYA SMENA correspondent G. Vybornova: "Public Disclosure of Effects of Chemical Plant Waste; The Rate of Infant Mortality in Dzhambul Is 39.5 Percent as Compared to a Republic Average of 29 Percent. The Rate in Dzhambulskiy Rayon Is 46.7 Percent"]

[Text] These figures were included in just the same way in the subtitle of an article in the first issue of the new publication OAZIS [OASIS]. It was not even an article, but a public health report from the republic center. Residents of Dzhambul finally learned the truth about their city, where three chemical plants are located.

Many readers were probably shocked to learn that spontaneous abortions in the polluted zone (these were the neighborhoods surrounding the plants, which are the first to be affected by chemical plant waste) occur 12.5 times as frequently as the average, the rate of premature births is 5.4 times as high as the average, and the rate of infertility is 3.8 times as high. People in the zone are 9.5 times as likely to seek medical treatment for acute respiratory diseases and 13.5 times as likely to seek treatment for chronic pharyngitis and laryngitis. The inhabitants of these neighborhoods are 7 times as likely to suffer from bronchial pneumonia.

The cardiovascular system also undergoes changes: The frequency of severe infarction is 12 times as high as the average and the rate of stenocardia is 4.3 times as high. The rate of oncological disease is also higher in the polluted zone: 42 times as high for gynecological cancers and 16 times as high for cancers of the respiratory organs. The entire report consists of numerical data of this kind on various diseases. The report ends with the statement that

Zavodskiy Rayon Chief Public Health Physician Kh. Mamedakhunov remarked at a recent Dzhambul Medical Institute applied science conference that the genetic effects of pollution have not been investigated thoroughly.

We shall see if this distressing news provides the momentum for immediate measures for the ecological recovery of the city.

REGIONAL AFFAIRS

Oresund Straits Bridge Seen as Threat to Baltic
*91WN0492A Stockholm DAGENS NYHETER
in Swedish 16 May 91 p 19*

[Article by Gosta Karlsson: "Decision Now Too Hasty; Marine Ecologist Invalidates Data on Oresund Bridge"—first paragraph is DAGENS NYHETER introduction]

[Text] It is not possible to make a sound decision about the Oresund bridge on the basis of the data on the environmental effects available at this time. If we alter the water flow through the Oresund, the effects will begin to be visible only after 15-20 years.

This was the conclusion of Bengt-Ove Jansson, professor of marine ecology at the University of Stockholm, at a public hearing on the Oresund connection which the Center, Environmental, and Left Parties arranged on Wednesday. "The Traffic Committee, which handles the bridge issue, denied us open hearings," said Bertil Fiskesjo of the Center Party.

Bengt-Ove Jansson warned of the risk that the construction of the bridge, which the governments of Sweden and Denmark have agreed upon, would alter the water flow through the Oresund and thereby cause irreparable damage to the Baltic's sensitive eco-system. The influx of fresh water from the North Sea has a crucial significance for, among other things, oxygen content and cod-fish spawning in the Baltic.

The primary reason that the current data is inadequate for making a decision on the bridge question is, according to Bengt-Ove Jansson, that it lacks important information and that the information supplied is "used completely incorrectly with regard to time and space scales."

Agreement on the 'O' Solution

"An earlier proposal for a bridge to Saltholm and a tunnel to Zealand was scrapped after we were able to demonstrate, in conjunction with SMHI [Swedish Meteorological and Hydrological Institute], that water with higher salt content than 20 parts per thousand would not make it into the Baltic. Now, a so-called 'O' solution has been agreed upon which entails compensating for the reduced water exchange through dredging.

"Theoretically and technically speaking, it would be fine to create such an 'O' solution. But we can not possibly know how this compensatory dredging would function in reality. Dredging creates what we call 'suspended matter' out in the Kattegatt. What will happen to it? How long will it stay there? How often will it be necessary to dredge in view of the sedimentation which occurs? Only after 15-20 years will we be able to see the environmental effects—that is the time scale one has to use. And if it then proves that the 'O' solution was an incorrect solution, it is too late to correct it."

Other Countries

Bengt-Ove Jansson was extremely critical of the fact that the bridge issue has not been discussed with other countries around the Baltic.

"There are seven bordering nations. The Oresund is not a Swedish-Danish possession. It is inconceivable to me that the other countries have not been brought into the discussions. I have colleagues who are seriously upset about the consequences the construction of the bridge can have for the future of fishing in the Baltic. In January this year SMHI measured zero oxygen at the 75 meter level in the Bornholm basin, which is the most important spawning ground of cod. Thank heavens fresher water came in later, but that shows how sensitive the system is."

Fishermen Feel Powerless

Reine Johansson, chairman of the Swedish Federation of Fisheries' Unions, described the powerlessness which fishermen feel about the whole bridge question. "Why will they not, in a responsible manner, hold a public debate on the consequences?" he wondered.

Goran Pettersson, associate professor of chemical environmental science at Chalmers, answered that there is an understanding between industry and government, a manipulation of the results which is directed toward an affirmative decision on the bridge.

"Even if they get the project, industry will lose with an auto bridge. They are investing in a transportation system which will be obsolete in the Twenty-First century. By then, other countries will have exhaust-free vehicles, and there we will be with an erroneous investment," he said.

GERMANY**Ecological Damage at Soviet Bases Reviewed**

*91WN0528A Munich SUEDDEUTSCHE ZEITUNG
in German 1 Jun 91 p 33*

[Article by Thomas Froehlich: "Under the Red Flag: Ecological Damage by Soviet Forces To Cost Billions"—first paragraph is SUEDDEUTSCHE ZEITUNG introduction]

[Text] Bonn, 31 May—Oozing fuel, leaking oil tanks, buried ammunition, uncontrolled garbage dumps, and decrepit facilities for sewage treatment, the environmental damage from the departing Soviet soldiers will cost the German taxpayers billions. To be sure, the reconstruction will also provide economic opportunities for East German enterprises. But the repairs have not even begun yet. Only now has the registration of the past burdens started and that is difficult enough. Federal Environmental Minister Klaus Toepfer will fly to Moscow on Sunday to talk with the Soviets about improving cooperation.

In Laerz, in Mecklenburg-Vorpommern, a Soviet air force base and reloading station for kerosene, thousands of tons of the aircraft fuel have seeped into the ground. In the above the ground water, an enormous lake of kerosene has accumulated over the years, which must now be pumped

off. Bonn environmental politicians of all parliamentary groups are now reporting on this kind of environmental damage more and more often when they come back to the Rhine from on-the-spot investigations in East Germany. Of course much damage is still unknown: what lies buried there under the protection of the Red Flag and may be seeping into the ground water or will explode someday is still largely in the dark. The Western Group of Soviet Forces (WGSS) had command of some 1,000 pieces of property—from barracks to housing and ammunition depots to fuel depots—in a total area of 243,000 hectares.

Spot Checks

Perhaps there is not an ecological time bomb ticking at every training area but a comprehensive overview of the damage will not be available until the end of 1994. At that time, all members of the Red Army are supposed to have left the country in accordance with the German-Soviet treaty on the withdrawal of troops. Spot checks are already being carried out at the vacant property, the Soviets are packing their bags at 180 facilities this year, on behalf of the Federal Environmental Ministry and in cooperation with the Soviets and the involved Laender and communities. The results are supposed to be available in June.

In view of the in part dramatic environmental damage, the Environmental Ministry also knows that this money can at best finance the start for a program to detect and clean up past burdens that is probably unique in the world. It is for this reason that the federal budget includes another DM540 million in the next four years for immediate measures to protect against health dangers, because it is necessary to act just as quickly in the case of endangered ground water as in the securing of garbage dumps. But Toepfer considers even the half billion to be completely inadequate.

No one knows how much the actual clean-up, which has not even begun yet, will ultimately cost. The magnitude named is "tens of billions"; but no one in the IABG [Industrial Management Company, Ltd.] or in the Environmental Ministry wants to speculate about this. Still, it is certain that the rebuilding should give a push to the regional economy. But even today there is already a dispute about who should pay for this expansive program. Land environmental ministers such as Matthias Platzeck from Brandenburg, referring to Article 120 of the Constitution (outlays for occupation costs and burdens in the aftermath of war), see an obligation primarily of the federal government, quite apart from the fact that the Land money chests are empty anyway. Federal Finance Minister Theo Waigel (CSU) [Christian Social Union], on the other hand, hopes that he can present the Soviets a bill. Under the transfer or financing agreement from October 1990, the values created by the USSR in the ex-GDR, supposedly DM10.5 billion, should be credited against the damage caused by them.

Of course this settlement has its problems. For one thing, it is not at all certain yet whether anything will be left after the balancing. In addition, it is feared that the Soviets could get the idea, in accordance with the old military

motto of "conceal and deceive," of "shoveling under" past environmental damage to save costs. For this reason, Toepfer does not think much of a painstaking settlement of mutual accounts but out of concern for additional past burdens prefers to go right to the taxpayer's pocketbook.

Concealment Actions

There are already indications of such concealment actions as the filling of trenches, for example. In the Environmental Ministry, however, they are reluctant to reproach the Soviets and to reveal more and more new negative examples. The cooperation with the WGSS has supposedly improved considerably and just a few days ago the WGSS established its own environmental department. Environmental guidelines are now to be worked out together. The fact that Toepfer wants to talk about the matter during his visit to Moscow means, however, that the Kremlin is supposed to be made even more sensitive to the environmental problems in the ex-GDR. It is understandable that Bonn is putting so much emphasis on successful cooperation. Now, the bosses in the ex-GDR, the Soviets must now allow the capitalists to inspect the barracks. That is painful to many and could lead to undesirable reactions, and Bonn wants to avoid them.

Soviet Military, FRG Environment Officials Confer

PM2306131791 Moscow KRASNAYA ZVEZDA
in Russian 15 Jun 91 Second Edition p 2

[Report by correspondent Colonel V. Markushin: "Seminar In Wuensdorf"]

[Text] A meeting has been held in Wuensdorf between the Western Group of Forces command and the environment ministers of the new federal Laender of Germany. It was held in the form of a seminar, at which there was a discussion of the ecological situation in the Soviet garrisons and questions of collaboration between the Western Group of Forces and federal and local conservation organs.

In his speech Major General Ye. Stepanov, deputy commander in chief of the Western Group of Forces, said that in planning and carrying out conservation work the Western Group of Forces aimed at carrying out the maximum amount of work through the efforts of Soviet units. At the same time, he stressed the need to reach a political decision on a once-only payment for buildings and installations constructed by Soviet forces, with a certain amount deducted for pollution. This would spare the sides lengthy arguments and would contribute to combined efforts to eliminate the consequences of ecological damage.

ITALY

Low-Lead Gasoline Law in Effect

91WN0524A Milan PANORAMA in Italian 9 Jun 91 p 159

[Article by Amelia Beltramini: "Aromatic Poison"—first paragraph is PANORAMA introduction]

[Text] Since 1 June gasoline contains less lead. But more benzene. Carcinogenic.

Italian automobiles disperse 1.3 to 7.9 grams of incompletely burned hydrocarbons into the air for every kilometer traveled. The super quality without lead, the so-called green gasoline, is composed of 43 to 45 percent aromatics by weight and 2.5 to 5.38 benzene. The aromatics are carcinogens; benzene is the most dangerous of them all. And yet it is precisely these components which are destined to increase in the composition of fuel.

Beginning on Saturday, 1 June the law imposes new maximum limits on the content of tetraethyl lead in super gasoline: 0.15 grams per liter instead of 0.30. A step ahead for public health: The metal is very harmful. But there are also two steps backward: In Italy the technologies for producing gasoline at present permit only one alternative to lead as an antiknock component: those same aromatics. Giuliano Salvi, vice president of the Lombard Atmospheric Pollution Committee and associate professor of applied chemistry and petroleum technology at the Politecnico of Milan, makes this calculation: "The petroleum industry will increase the amount of aromatics by 4 to 5 percent by weight." The oil people confirm this data substantially, even though they use percentages by volume. "It is true that the aromatics ought to tend to increase," says Nino Bigi of the Petroleum Union, the association of gasoline producers. "We begin with an average content of 35 percent of aromatics in Italian gasolines; in volume it reaches around 38 percent.

It is possible to produce cleaner gasoline; to such an extent that the Clean Air Act of the United States provides that in the "nine most polluted metropolitan areas, only gasolines containing total aromatic hydrocarbons lower than 26 percent of their weight, benzene lower than 1.3 percent, and those without heavy metals are to be sold." "In Europe, not just in Italy, the law does not demand that gasolines meet these requirements, and the installations are not equipped to conform to them," they respond at the Petroleum Union.

The report of the national consultative toxicology committee on 5 July 1990 advised that an increase in cases of leukemia and tumors of the lungs, pancreas, kidneys, bladder, testicles, liver, and stomach correlates with an increase in aromatics in gasoline. The committee indicated that in coming years from 228 to 1,627 persons could die of leukemia and up to 3,529 of lung tumors. And these projections were based on the hypothesis that benzene and benzopyrene dispersed in the air would increase only through greater consumption of green gasoline (that is, without lead and with more aromatic hydrocarbons) even in automobiles not equipped with catalytic converters. The opinion expressed by the committee is the first serious study to correlate chemical data on atmospheric pollution from vehicular traffic with clinical data, "Salvi points out. "The basic pollution, that is, the benzene and benzopyrene from traffic that were in the air already before lead-free gasoline, was really much worse than was thought by those making the report. So the epidemiological consequences

will be more serious." At the Petroleum Union they respond that "the benzene content of lead-free gasolines has dropped."

The WHO estimates that every microgram of benzene per cubic meter of air causes four leukemia deaths per million residents exposed. The toxicological committee quantifies the basic pollution from benzene due to traffic as 12 to 18 micrograms per cubic meter (hence, as a mathematical projection, from 48 to 72 deaths from leukemia per million residents). But in November the provincial laboratory of Milan found average values of 165 micrograms per cubic meter in high traffic zones (with peaks of long duration at 300); translated into leukemia cases this would involve 660 new cases per million residents.

There are analogous or even worse situations in Naples, Turin, Rome, and Genoa. Salvi wrote to Giorgio Ruffolo, minister for the environment: "In the air of heavily traveled urban areas where five out of 10 Italians live, an average content of benzene under 40 to 50 micrograms is hard to find." The cases of leukemia due to the basic percentage of benzene may become 160 to 200 per million residents exposed, that is, from 4,320 to 5,400 nationwide. By adding the benzene emitted by automobiles without catalytic converters that use green gasoline because of its lower price at the pump, not only must another six grams of benzene be added, as calculated by the committee, but 15 to 17; which is to say from 1,620 to 1,836 more cases of leukemia.

The mathematical projection that takes into account the increase in aromatic hydrocarbons used to compensate for the reduction in lead further indicates an increase of 66 deaths from leukemia per million residents in Milan, 88 in Naples, and 16 in the average Italian city. All this despite the fact that the law specifies that "the reduction in the amount of lead must not involve a significant increase in the quantity of other pollutants." Summarizing the total, deaths through leukemia alone caused by traffic will oscillate between 6,372 and 7,668.

UNITED KINGDOM

Environmental Security Service Proposed 91WN0513A London THE DAILY TELEGRAPH in English 18 May 91 p 7

[Article by Toby Moore, Environment Correspondent]

[Text] A defence initiative which would return the Navy to the scientific traditions that sent Captain Cook to the Pacific and put Charles Darwin on the Beagle is being backed by Admiral Sir Julian Oswald, the First Sea Lord.

Sir Julian argues in a paper to be published next year that, in a post-Cold War age, an environmental security service could assist the huge international scientific effort trying to gauge the consequences of climate change.

The paper, presented to the Global Security Programme at Cambridge University, is seen as part of an effort by the Navy to define a future role in the face of a Whitehall review of its function.

The sophisticated equipment carried by frigates and submarines could join the huge global oceanographic survey under way to measure sea pollution.

"Ways are being considered by which this could be achieved, including fitting physical and biological sensors to RN vessels, including the Royal Yacht Britannia."

Sir Julian says that armed forces may, in the future, be required to act as "world policemen" under the banner of the United Nations. Erosion, drought and pollution must also be treated as potential sources of conflict.

It could also involve protecting fish stocks. There is rising concern that agreements on fish quotas are ignored.

Sir Julian maintains that the Royal Navy could return to the scientific traditions of men such as Captain Cook without compromising the ability to defend.

"Environmental and traditional security concerns are now explicitly interwoven: they have met and been introduced," he said.

The world needed to act to manage environmental affairs, and a new law of the sea stressing stewardship rather than exploitation must be considered.

"Failure to take these actions is likely to lead to instabilities in which the forces of traditional security will be heavily engaged.

"The navies of the world are well placed to take on a limited role of world guards to police the seas, but international agreement is an essential pre-requisite," Sir Julian writes.

"It is now clear that our field of view is expanding from the self-interest of the nation-state to a wider awareness of our position as an integral component of the planet."

He says that naval forces are historically attuned to a link between the environment and security. The decline in Venetian sea power during the 16th century was linked to a fall in suitable forestry for ship building.

"One of the reasons quoted by Iraq for its invasion of Kuwait was the latter's so-called stealing of oil which Iraq wanted to claim for its own."

Sir Julian says the Gulf war has proved it is too soon to beat swords into ploughs. There is still a threat from the Soviet Union, which continues to manufacture submarines and ships.

"Traditional security must be maintained, but commensurate with perceived threat and additional instabilities produced by environmental pressures," he adds.

Dr. Gwyn Prins, fellow of Emmanuel College and director of Cambridge University's Global Security Programme, said the paper represented "the most significant statement

about the philosophy of security from so senior a figure since the Second World War."

Dr. Prins last week published *Top Guns and Toxic Whales*, which expounds the theory of global security. He said the navy was "doing badly" in the Whitehall review and needed to stress its wide range of civil capabilities, from rescuing victims of natural disasters to assisting scientific research.

British-Irish Joint Panel Reports Sellafield Nuclear Findings

*91WN0518A Dublin IRISH INDEPENDENT
in English 10 May 91 p 11*

[Article by Bernard Purcell, London Editor]

[Text] Fish and shell-fish caught near Sellafield are safe for human consumption because radiation levels there are a minute fraction of what is regarded as a safe annual dosage, according to a report compiled by MPs and TDs. However, the MPs and TDs attending the British-Irish Interparliamentary Body plenary session in London were unable to reach agreement on endorsing the report.

Referring to radioactivity from the Sellafield nuclear reprocessing plant, the report finds: "Discharges of both alpha and beta radioactivity have been dramatically reduced from their peak in the mid-1970s. Levels of caesium found in fish in the Irish Sea have diminished sharply."

Surveys of radiation levels are routinely carried out on silt, seaweed, fish, crustaceans and seawater, it says.

"The additional exposure to a human being resulting from average consumption of shellfish from the Sellafield area is about 10 microSieverts while the average annual exposure to radiation from natural sources is 2,200 microSieverts, rising to 7,000 in Cornwall.

"Independent surveys by the Nuclear Energy Board in Ireland have confirmed that there is no evidence that current radiation levels in the Irish Sea pose any threat to marine life or any significant health hazard to the Irish public," the report states.

Entitled "Environmental Issues Affecting the United Kingdom and Ireland," the report points out that TDs and senators have expressed concern about the safety of transporting nuclear fuel for reprocessing at Sellafield through the Irish Sea. But it says the fuel is carried "in specially constructed containers of up to 110 tonnes weight, made of steel and lead and complying with regulations laid down by the International Atomic Energy Authority."

At a press conference in London to mark the end of the three-day session, the joint chairmen, Conservative Mr. Peter Temple-Morris and Leas Ceann Comhairle Jim Tunney TD, admitted that British and Irish members had been unable to agree on the continued operation of Sellafield.

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